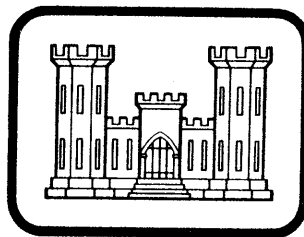


# **BLIZZARD OF '78**

## **COASTAL STORM DAMAGE STUDY**



***NEW ENGLAND DIVISION  
CORPS OF ENGINEERS  
WALTHAM, MASSACHUSETTS***



***FEBRUARY 1979***

A REPORT  
ON  
THE ASSESSMENT OF FLOOD DAMAGES  
RESULTING FROM THE STORM  
OF 6-7 FEBRUARY 1978  
ALONG THE COASTLINE  
FROM  
ORLEANS, MASSACHUSETTS TO NEW CASTLE, NEW HAMPSHIRE

New England Division, Corps of Engineers  
424 Trapelo Road  
Waltham, Massachusetts 02154

FEBRUARY 1979

## PREFACE

In the aftermath of the devastating coastal storm of February 6, 7, 1978 it became apparent that a need existed for an in-depth evaluation of the storm's effect upon the coastline. As a means of documenting these effects, the New England Division (NED) approached the states of Massachusetts and New Hampshire with a proposal to collect and display the impact of the storm on their coastal communities using funds available to the Corps of Engineers under authority contained in Section 22, Public Law 93-251, Planning Assistance to States, as further explained under Section I. of this report. Both states agreed with the need for early acquisition of data and some \$55,000 was committed to this study in July 1978.

The major thrust of this study effort was directed toward the compilation of costs and losses attributable to water related damage as produced by the storm. These figures existed in a highly fragmented form, and were dispersed throughout the public and private sectors. Close to half of the total study cost was expended in contacting and interviewing sources of data.

The Flood Plain Management Section of the Basin Management Branch of NED was designated as the study unit. The scope and framework of the study report was coordinated with internal elements within NED, as well as with both State Coordinating Offices. These offices, viz., Special Disaster Recovery Team (Massachusetts) and Office of Comprehensive Planning (New Hampshire) were instrumental in providing guidance in establishing report format, as well as in a liaison role with other State Agencies where data was located.

The report, as it was originally conceived, and finally published, was to be, above all else, a presentation of cost data from the storm. Narrative and figures were added to provide the reader with background and some physical parameters of the storm, but the "heart" of the report is to be found in Appendix B, "Cost and Loss Tables."

The arduous task of data collection progressed throughout the summer months of 1978. It was interesting to note that even six months after the storm, much of the information that was requested was unavailable because it was "too soon." In many cases, data which was collected and reported herein was considered "Preliminary" by the reporting agency and its use was accompanied by a cautionary note that later revisions could be forthcoming. The data, as reported here, is that initially provided unless revisions were received prior to publication.

It was anticipated at the outset that all data could ultimately be allocated to the community in which the losses occurred or the money was spent. This assumption proved overly optimistic, and certain data is reported in the State summaries which cannot be accounted for by totalling

the community data. Also, the ideal community cost framework, as laid out in Table 9, did not always lend itself to the method in which data was available, with the consequent "empty" categories where one would prefer to see cost breakdowns. For example, it was originally hoped that environmental losses would be quantified, and that these figures could be included in the community loss breakdown. At the time of publication, however, this information had not been forthcoming from any of the involved agencies.

In several instances, losses were reported by communities, which appeared to be unusually high when compared to surrounding communities or to other loss parameters. In these cases, the contributing source was contacted, and unless new figures were provided and the original data refuted, information was published as given.

Another major task undertaken, as part of the scope of this study, was the acquisition of vertical color photography of the immediate coastline of most of the study area (Cape Cod Canal to New Hampshire-Maine state line). A discussion of the characteristics of this photography may be found in Section VIII. The photography provides a highly visible permanent record of the physical condition of the coast in September 1978. Color prints have been turned over to the State Coordinating Offices, with a set of prints and the negatives being retained at NED. In addition to its visual value, this controlled photography will allow for subsequent topographic mapping of the coastal area by those interested, who should so desire to undertake the additional investment, in the form of ground control (survey) and photogrammetric compilation (mapping). This task could be done selectively; that is, for limited reaches of the coast, if and when required. Such maps would allow physical measurements, both horizontal and vertical, to be made of structures and natural features in the coastal area. Should another major coastal storm occur, these measurements would provide a quantified "before" condition for evaluating physical changes.

This study report is being published on the first anniversary of the "Blizzard of '78." The costs sustained by water related damages as reported herein serve as a reminder of the high public and private cost of continued occupancy of the coastal hazard area. Apart from the preservation of historical information, it is intended that this report have ongoing value in the future. It has frequently been very difficult to evaluate various coastal protection strategies, because cost savings data (elimination or reduction of damage) has been unavailable, or at best, highly conjectural. This report makes available comprehensive, documented loss data from an actual storm event, for use in such future studies. Certainly this information will be utilized in the planning function of NED, and it is hoped it will be of similar value to the Coastal Zone Management Offices of the respective States. Community planners and other officials may derive benefit from the data as it relates to numbers of residential and commercial units impacted by the flooding produced by this major coastal event. The proportion of this property which was insured is also of interest to many public agencies.

All offices which participated in contributing information to the study will receive copies of this report. Communities within the study area will receive two copies each and the two State Coordinating Offices will receive 100 copies each for subsequent distribution to other State Agencies and interested parties. Additional copies are on file at NED.

CREDIT

Cover photograph of the Sand Hills Section of Scituate, Massachusetts courtesy of Jay Spaulding, Ft. Washington, Maryland (all rights reserved).

## ACKNOWLEDGMENTS

This study was performed with the authorization of the Division Engineer, Colonel John P. Chandler, under the direction of Mr. Joseph L. Ignazio, Chief of Planning; Mr. Lawrence J. Bergen, Chief of Basin Management; and Mr. Paul E. Pronovost, Chief of Flood Plain Management, New England Division (NED), Corps of Engineers. The staff of the study unit, specifically Ms. Cathy O'Connell and Mr. Grant Kelly, provided many services during the course of the study.

The two State Coordinating Offices, viz., Special Disaster Recovery Team (Massachusetts) and Office of Comprehensive Planning (New Hampshire) spoke for the respective state needs, and provided valuable liaison with other state agencies who ultimately provided significant data to the study. Many elected and appointed officials of the local communities within the study area gave unstintingly of their time and local knowledge to provide the estimates shown in the Municipal Summary Tables.

The services of Schoenfeld Associates, Boston, Massachusetts, in interviewing sources, collecting and tabulating data, and preparing major portions of the text are acknowledged. The vertical color photography of the immediate coast was performed by Moore Survey & Mapping Corporation, Shrewsbury, Massachusetts.

A major contributor of data presented herein was the Boston Office of the Federal Disaster Assistance Administration (FDAA). In addition to playing a lead role during and following the storm, FDAA compiled massive amounts of data which were made available to this office.

Special mention is also made of the contribution of the Boston Office of the Federal Insurance Administration (FIA). At the request of NED, special computer programming was undertaken to generate the building and contents insurance claim data appearing in Appendix B, Table 9. This data, and its relationship to total damage estimates in most communities, dramatizes the low percentage of losses which were insured.

All other contributors, who gave of their time and information, are gratefully acknowledged.

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## I. Authority

Authority for this study is derived from Section 22, Public Law 93-251, "Water Resources Development Act of 1974." This statute authorizes the Corps to "Cooperate with any State in the preparation of . . . plans for the . . . utilization of the water and related resources . . ."

## II. Purpose

This report assesses the 6-7 February 1978 storm flood damages to 40 Massachusetts and 6 New Hampshire coastal communities from Orleans, Massachusetts to New Castle, New Hampshire. The effect of record snow-fall on 20 January 1978 on February storm damage is also considered.

## III. Meteorological Events

### a. Origin, Development and Track

The storm responsible for the 'Blizzard of 1978' was created by two low pressure areas: one containing cold, dry Arctic air from northern Canada and the other consisting of warm, moist air from the mid-Atlantic Ocean. These factors, combined with the predicted astronomical high tides, generated the weather system responsible for the extensive coastal flooding.

Plate I plots the track of the storm at surface elevations. (Ref. 1) A weak low pressure area which had formed at the surface of the Atlantic Ocean moved westward on Sunday, 5 February. (Ref. 2) That afternoon the closed center of the low pressure area was first detected off the Carolina coast. Because of its location near the Gulf Stream, the low pressure area had an inexhaustible supply of warm (68° F.) moist air. (Ref. 3) At the same time, another low pressure area, more intense than the first and containing very cold air (-40° F.) at high levels (18,000 ft), moved south from Canada over the Great Lakes and headed toward Ohio and Virginia.

The warm, moist, low level, low pressure area met the cold, dry upper level low pressure area off the coast of Cape Hatteras on Sunday night creating a 'Cape Hatteras Storm' type weather pattern. The merger of the low pressure areas formed one of the most intense and dangerous storms ever recorded along the east coast. The 110° F. temperature differential between the two air masses produced a very rapid and continuous rise of the warm, moist air from the surface of the ocean. This moisture condensed at higher altitudes and fell in the form of snow as the storm moved up the east coast parallel to the edge of the Continental Shelf. The National Weather Service declared the intensifying low pressure area to be an offshore gale (winds 34 to 47 miles per hour) on 5 February at 5:00 p.m. EST. (Ref. 1) All times in this report are Eastern Standard Time.

#### b. Antecedent Conditions

During the month of January, four winter storms hit the New England coastline: a rainstorm on 9-10 January with an excess of 1.0 inch of water; a snowstorm on 13-14 January with an excess of 1.5 inches of equivalent water; a snowstorm on 20-21 January with an excess of 2.0 inches of equivalent water; and a rainstorm on January 25-26 with an excess of 2.0 inches of water. Before and after these storms, the weather in the study area consisted of slightly below normal temperatures with greater than normal sunshine resulting in favorable snowmelting. This aided in reducing coastal flooding by allowing coastal water to gradually recede.

The rainstorm of 9-10 January coincided with January's natural highest tides to cause coastal flooding. The snowstorm of 20-21 January, which deposited between 10 and 20 inches of snow, greatly impeded the drainage of the coastal areas.

Between the 20-21 January snowstorm and the February blizzard the weather along the coastline was favorable for snowmelting. With the aid of the 25-26 January rainstorm, the snowfall depths decreased from 14 to 0 inches in Providence, from 26 to 0 inches in Boston, and from 22 to 9 inches in Portland. Therefore, due to the 25-26 January rainstorm and favorable snowmelting weather, the effects of January's flooding and snowstorms had disappeared by 6 February.

During the interviews in the coastal communities, the local officials further reinforced this fact by stating that any coastal flood damage done in January was either repaired prior to or was insignificant in comparison to the damage caused by the February blizzard.

#### c. Effect of Tides

Unusually high tides were expected along the New England coastline on the night of Monday, 6 February and the morning of Tuesday, 7 February. The reasons for these higher than normal tides were as follows: (Ref. 4)

1. On Tuesday, 7 February, at 9:56 a.m., there was a new moon. At the time of a new moon, the tides, called spring tides, are either higher or lower than the mean.
2. The moon was at its perigee, the closest point in its orbit of the earth, on Sunday, 5 February. The proximity of the moon to the earth at this time results in a stronger than usual influence on tides with a maximum effect experienced approximately 2.5 days following the attainment of the perigee.

3. The axes of the elliptical orbits of the earth and the moon rotate very slowly within their respective orbital planes. Once every 18.6 years, the orientation and strength of the sun and moon's attractive forces combine to produce a nodal tide. This nodal tide cycle peaked in early February to produce a wider range of tidal elevations than would otherwise be anticipated.

The perigean spring tide occurred during the peak of the nodal tide cycle on 6 and 7 February. These factors, combined with the winds generated by the intense and slow moving low pressure system, created record and near-record tidal elevations during two high tide periods along the coast of Massachusetts, New Hampshire and southern Maine.

Predicted and recorded tidal elevations for 6 and 7 February for Boston, Hampton Harbor, Portsmouth and Portland are plotted in Figures 1-8 in Appendix A. (Ref. 5, 6 and 7) No storm surge is indicated for Hampton because only maximum and minimum tidal elevations were reported. All elevations are recorded in feet above the National Geodetic Vertical Datum of 1929 (NGVD). The maximum tidal elevations on Tuesday morning for Boston, Portsmouth and Portland were 10.3, 8.8 and 9.6 feet, respectively. These values compare to 11.0 feet (adjusted) for the 16 April 1851 storm in Boston, 8.5 feet for the 19 February 1972 storm in Portsmouth and 8.7 feet for the 30 November 1944 and 20 December 1945 storms in Portland. (Ref. 4, 5 and 6) Based on preliminary high water mark data throughout the study area, the storm can be considered to have a return frequency close to 100 years.

At Provincetown, the Provincetown Center for Coastal Studies established a gaging station during the peak period of high tide on Tuesday, 7 February. It reported that the tide crested between 10:31 and 10:51 a.m. The height of waves at that time was negligible with a range of 0.2 - 0.4 feet. The predicted high tidal elevation of 6.5 feet was increased 3.5 feet to 10.0 feet as the result of the storm surge. (Ref. 8) This compares to an observed tide level of 9.8 feet for the 26 December 1909 northeaster. (Ref. 4)

The Provincetown Center for Coastal Studies also cited wind records from the Race Point Coast Guard Station indicating that for a 17.5 hour period on 6 and 7 February, the wind ranged from 29 to 69 m.p.h. out of the east and east northeast and that for an 18 hour period on 7 and 8 February, the wind ranged from 34 to 46 m.p.h. out of the northeast and north. (Ref. 8)

#### d. Storm Progress

Storm center locations from 5 to 8 February have been identified on Plate I. This information indicates how the storm affected the coastal area as it moved slowly past New England.

Meteorological data recorded in Providence, Boston, and Portland have been charted for 6 and 7 February. Temperature, barometric pressure, and precipitation are presented in Figures 9-14. Plots of wind speed and direction during the storm are also presented for these three cities in Figures 15-20. All figures are contained in Appendix A.

On Monday, 6 February, the high tide in Boston, which occurred at 9:30 a.m., was 0.7 feet higher than predicted. At 11:00 a.m., the National Weather Service declared the intensifying low pressure area located east of the Maryland coast to be a storm (wind speed 47 to 55 miles per hour). In Boston, however, winds remained at gale force. Traces of snow began falling at 8:00 a.m. in Boston although snow did not begin accumulating appreciably until 6:00 p.m. Low tide that afternoon at 3:36 p.m. was 2.6 feet higher than the anticipated level. The temperature, which reached a high of 33.5° F. at noon, dropped to a low of 29° F. between 4:00 and 5:00 p.m. The approaching low pressure area continued to move northward along the coast throughout the afternoon, reaching a point east of the New Jersey coast by 7:00 p.m.

By evening, the temperature had again climbed above the freezing point in Boston, while barometric pressure continued to drop. Between 4:00 and 10:00 p.m., the northeast winds increased to storm force at 47 to 51 m.p.h. High tide at 9:42 p.m. resulted in a 4.4-foot tidal surge above the predicted level. At 10.0 feet, this level was 0.7 feet higher than the previous modern record attained on 29 December 1959 (based upon data since 1921). By midnight, 8.1 inches of snow had fallen.

On the morning of Tuesday, 7 February, the temperature dropped below freezing in Boston; snow continued to fall heavily, especially during the early hours. Barometric pressure reached a low of 29.33 inches at 6:00 a.m. The low tide at 4:24 a.m. resulted in water elevations 3.6 feet above the anticipated level. The high tide at 10:39 a.m. produced a record-tying elevation of 10.3 feet, a 3.4 foot surge above the predicted level. This elevation was over 3 inches higher than the level experienced the evening before.

The slow moving low pressure area remained stalled near Nantucket Island throughout the morning. The quasi-stationary position of the center of the storm Monday night and early Tuesday was attributable to the blocking action of a high pressure area in Canada.

On Tuesday afternoon, the storm started to move eastward more quickly. The barometric pressure began to climb slowly in Boston. At 6:00 p.m., the National Weather Service downgraded the storm to a gale due to decreased wind speeds. Snowfall, which began tapering off

before noon, ended at 10:00 p.m. with a total accumulation of 27.1 inches. Tide elevations, although still in excess of the predicted levels, became more normal.

The storm, still dangerous, moved into the North Atlantic where it menaced the heavily traveled shipping lanes for days. On 7 February, a ship east of the storm center reported 20-foot waves and easterly winds of 75 m.p.h. On 9 February, when the storm center was east of Newfoundland, ships reported 30-foot swells. The storm track after the major damage was done brought the storm east of Newfoundland where it turned northward. It then moved west, crossed the Labrador coast on 11 February, turned southward then eastward and finally disappeared over the Gaspé Peninsula on 13 February 1978. (Ref. 9)

#### e. High Water Marks

The Water Resources Branch of the U.S. Geological Survey in Boston, in cooperation with the Massachusetts Department of Public Works, has published a report for the Corps under separate authority documenting high water marks. This report, entitled "Coastal Flood, 6-8 February 1978, Maine, Massachusetts and New Hampshire," lists 200 locations in Massachusetts and 67 locations in New Hampshire where high water marks were recorded.

#### f. Time-Impact Relationship

The following scenario is presented to indicate the time sequence of the storm before, during and after it reached the study area.

##### Saturday, 4 February

7:00 a.m.: The National Weather Service detected the formation of a weak surface low pressure area approximately 1300 miles east southeast of Cape Hatteras and traveling in a westerly direction.

##### Sunday, 5 February

5:00 a.m.: The National Weather Service issued a winter storm watch for all of New England. (Ref. 2)

7:00 a.m.: The National Weather Service's maps showed an upper altitude low pressure area with extremely cold temperatures over Lake Erie travelling southeastward toward western Pennsylvania.

5:00 p.m.: The National Weather Service declared the low pressure area formed off Cape Hatteras to be an offshore gale.

Monday, 6 February

7-8:00 a.m.: The National Weather Service recorded traces of snow in Boston.

10:00 a.m.: The following forecast was issued by the National Weather Service in Boston: "Eight to 16 inches expected in sections. The snow will be accompanied by strong easterly winds resulting in considerable blowing and drifting ... Extensive flooding of low-lying coastal areas is expected at time of high tides both tonight and Tuesday morning ... Travelling will become very hazardous later today and should be curtailed except in emergency." (Ref. 11)

11:00 a.m.: The National Weather Service upgraded the classification of the low pressure area from a gale to a storm. (Ref. 2)

1:30 p.m.: The Emergency Operations Center consisting of members of the Massachusetts Army National Guard and Headquarters 26th Infantry Division became operational. (Ref. 10)

4:00 p.m.: The Mayor of the City of Boston declared a snow emergency.

7:00 p.m.: Waves started washing over the seawalls along Beachmont and Ocean Shore Drive in Revere. (Ref. 11)

7:32 p.m.: The five-man crew of the pilot boat "Can Do" left to answer a distress call from the grounded tanker "Global Hope" in Salem Harbor. (Ref. 11)

Monday Night: A 5-year old girl drowned in Scituate when the fire department boat carrying her to safety capsized. (Ref. 12) A 62-year old man drowned while trying to rescue her. (Ref. 11)

Governor Thomson of New Hampshire activated the State Emergency Plan.

9:00 p.m.: The National Weather Service in Boston recorded snow falling at the rate of 0.9 inches per hour with winds from the northeast at 50 miles per hour gusting to 79 miles per hour.

Nahant police began evacuating residents from homes along Lower Willow Road and White Way. (Ref. 13)

10:20 p.m.: High tide occurred in the Boston vicinity.

10:31 p.m.: Governor Dukakis declared a State of Emergency and called out the Massachusetts National Guard. (Ref. 10)

#### Tuesday, 7 February

1:30 a.m.: A blackout in Boston affected 75,000 customers of the Boston Edison Company. (Ref. 13)

Early morning: A 61-year old Nahant man drowned in his basement apartment when a large wave destroyed the house. (Ref. 13)

4:00 a.m.: Radio contact was lost with the "Can Do". The bodies of the five-man crew were found within two days. (Ref. 11)

8:50 a.m.: Governor Dukakis called to State duty the entire Army National Guard. (Ref. 10)

10:00 a.m.: Governor Dukakis banned all but emergency vehicles on State roads. This ban was lifted on a community by community basis through 14 February.

10:36 a.m.: High tide occurred in Boston Harbor.

11:00 a.m.: The National Weather Service in Boston recorded snow falling at the rate of 0.5 inches per hour with winds from the northeast at 31 miles per hour gusting to 52 miles per hour.

5:47 p.m.: President Carter declared Massachusetts a State of Emergency, thus allowing Federal aid for snow removal.

6:00 p.m.: The National Weather Service downgraded the low pressure area from a storm to a gale.

#### Wednesday, 8 February

8:00 a.m.: Governor Thomson released the National Guard from service and the State of Emergency for New Hampshire ended.

5:48 p.m.: The first Regular Army units to aid Massachusetts arrived at Logan Airport. Their first mission was to aid the snow removal; they were later used along the coast. (Ref. 14)



Thursday, 9 February

The National Weather Service removed the gale classification from the low pressure area.

Friday, 10 February

President Carter issued a Declaration of a 'Major Disaster' for Massachusetts. Governor Thomson requested that President Carter declare a 'Major Disaster' for the State of New Hampshire.

Saturday, 11 February

The Federal Coordination Officer of the Federal Disaster Assistance Administration (F.D.A.A.), with the cooperation of the State Coordination Officer, directed that Disaster Assistance Centers be opened on February 14 in Gloucester, Salem, Revere, East Boston, Scituate, Marshfield, Quincy and Hull. (Ref. 15)

Sunday, 12 February

U.S. Army and Army Reserve support ended. (Ref. 10)

Monday, 13 February

10:00 p.m. Emergency driving ban for Boston was lifted.

Tuesday, 14 February

President Carter issued a Declaration of Disaster for Barnstable, Bristol, Dukes, Essex, Nantucket, Norfolk, Plymouth and Suffolk Counties in Massachusetts. The disaster was designated FDAA-546-DR. (Ref. 15)

Disaster Assistance Centers were opened in Gloucester, Salem, Revere, East Boston, Scituate, Marshfield, Quincy and Hull. The hours of operation were 10:00 a.m. to 7:00 p.m. seven days a week. (Ref. 15)

Wednesday, 15 February

The Disaster Assistance Center in Winthrop was opened. (Ref. 15)

Thursday, 16 February

President Carter revised his original Declaration of Disaster to authorize aid to individuals as a result of loss from high winds, tidal surge, snow and ice under PL 93-288. (Ref. 15) He issued a Declaration of a 'Major Disaster' for New Hampshire and issued a Declaration of Disaster for Rockingham County in New Hampshire. The disaster was designated FDAA-549-DR.

Sunday, 19 February 19

Disaster Assistance Centers in East Boston and Gloucester were closed. (Ref. 15) All remaining Massachusetts National Guard units were released from State duty. (Ref. 10)

Monday, 20 February

A mobile team formed from personnel from the Gloucester Disaster Assistance Center spent one day in Ipswich. (Ref. 15)

Tuesday, 21 February

The mobile team from Gloucester spent one day in Newburyport. The Disaster Assistance Center in Quincy was closed. (Ref. 15)

The Disaster Assistance Centers in New Hampshire were opened.

Wednesday, 22 February

Follow-up Assistance Service Teams (FAST's) were opened in Hingham, Revere, Salem and Boston. The hours of operation were from 9:00 a.m. to 5:00 p.m. six days a week. (Ref. 15)

Thursday, 23 February

Disaster Assistance Centers in Salem, Marshfield and Winthrop were closed. (Ref. 15)

Friday, 24 February

The Disaster Assistance Center in Revere was closed. (Ref. 15)

Saturday, 25 February

The Disaster Assistance Centers in New Hampshire were closed.

Saturday, 4 March

The Disaster Assistance Center in Scituate was closed. (Ref. 15)

Monday, 6 March

The Disaster Assistance Center in Hull was converted into a Follow-up Assistance Service Team. (Ref. 15)

Wednesday, 8 March

A grant from the National Institute of Mental Health to the Massachusetts Department of Mental Health to establish 'Project Concern', a six-month crisis counseling service, was signed. Offices in Winthrop, Hull, Scituate, Plymouth, Revere, Salem and Quincy were opened.

Saturday, 11 March

Follow-up Assistance Service Teams in Hingham, Salem, and Boston were closed. (Ref. 15)

Friday, 24 March

Follow-up Assistance Service Teams in Revere and Hull were closed. (Ref. 15)

#### IV. Storm Impact

##### a. Areas of High Impact

The destruction along the Massachusetts and New Hampshire coastlines was associated with coastal flooding resulting from storm surge, unusually high tides and the huge waves which pounded the coast. Strong northeast winds in addition to the predicted high tides generated unusually high waves in some areas. On Monday, 6 February 1978, the winds in Boston averaged 31 mph. On Tuesday, 7 February, the winds averaged 35 mph, and for the period between noon on Monday and noon on Tuesday, the wind averaged 39 mph.

In general, as can be seen on Plate II, the areas where the most extensive damage occurred were those coastal areas with shorelines and bottom contours perpendicular to the wind direction and therefore the direction of wave approach. These areas include Marshfield, Scituate, Hull, Boston, Winthrop, Revere, Gloucester and Rockport in Massachusetts and Hampton and North Hampton in New Hampshire.

At the time of the extreme high tides, the winds along much of Cape Cod were relatively mild due to the proximity of the area to the center of the storm. This condition spared areas of the Cape from the severe wave-inflicted damage which occurred in many of the coastal areas of Massachusetts and New Hampshire.

##### b. Man-Made Structures

The effect of the storm on man-made structures in coastal areas was devastating. Buildings, roads, utilities and shore protection devices were either damaged or totally destroyed. The waves threw debris from destroyed structures, sand, rocks and even boulders onto roadways, homes, and businesses, thus causing additional damage. Many homes were knocked from their foundations by the surf and flood waters. Roads crumbled as the subsurface was washed away.

Along the eastern shore of Cape Cod, some homes located on barrier beaches and cliffs were damaged or destroyed. However, because development is not extensive in this area, losses were not great. Other areas of Massachusetts were not so fortunate. In Scituate, with development close to the surf zone, damage was extreme. Many homes were completely leveled by the force of the pounding waves. In some areas of the town, waves carrying sand and debris were seen overtopping houses. A section of seawall built in 1931 was totally destroyed. Sand and other debris was up to three feet deep in some sections.

In Marshfield and Hull, similar scenes were common. Many roads and businesses in the Brant Rock section of Marshfield were flooded, and many utilities were knocked out. Sections of roads close to the shore collapsed after the seawalls protecting them were destroyed, allowing the subsurface to be washed away. In Hull, homes were destroyed by the pounding surf while flood waters swept through deserted streets.

In Boston, several of the seawalls protecting the exposed islands in the harbor were breached. Material behind the breached sections was washed out, leaving large gaps in the seawalls. On Long Island, an estimated 167,000 cubic yards of sand and gravel were lost on the eastern side. In the northerly neck, sufficient material was lost to create the potential for loss of accessibility to the fort and lighthouse. Further evidence of the storm's impact is the "Peter Stuyvesant", a Hudson River paddleboat converted into part of a Boston Harbor restaurant complex, which was lifted from its concrete cradle by the rising tide and capsized.

On Deer Island in Winthrop, the location of the Metropolitan District Commission's sewage treatment plant and Suffolk County's House of Correction, seawalls were lost, buildings were damaged both from winds and water, and utilities were affected.

In Nahant, the causeway containing the single road connecting the town to Lynn was flooded, thus preventing any movement of vehicles or people. It was not until Wednesday afternoon that vehicular movement across the causeway was possible.

The Cape Ann communities of Gloucester and Rockport received heavy damage to commercial and residential properties due to storm surge. Wave action destroyed portions of seawalls and damaged some buildings along Brier Neck in Gloucester and heavily damaged both commercial and residential buildings in Sandy Bay at Rockport. The historic Motif Number One, a storage shed for fishing gear located on a pier in Rockport Harbor and considered to be one of the most photographed and painted buildings in the country, was completely destroyed by surf surge.

In Salisbury Beach, storm surge completely leveled commercial properties along the ocean side of a street in the amusement park and heavily damaged a new funhouse and a ballroom.

In New Hampshire, along North Beach in Hampton, Little Boar's Head District in North Hampton and the Rye Beach area, storm surge displaced thousands of yards of sand, broke up granite groins, and damaged steel and reinforced concrete bulkheads which protected roads and dwellings. Private dwellings and property were moderately damaged in North Hampton and Rye by surf surge with some dwellings being completely lifted from their foundations.

### c. Sensitive Coastal Areas

Erosion along the coastline of Massachusetts and New Hampshire as a result of the storm was severe. The extent of storm erosion is a function of wave conditions, storm surge, the stage of the tide and storm duration. As is evident by the amount of property damage caused, these factors were additive in producing the severe impact.

Three consequences of erosion are: 1) the undermining of structures, 2) the reduction of usable beach area and 3) the covering of shellfish beds. The monetary loss of the erosion itself has been quantified in Table 6 (found in Appendix B) for locations where information was available.

Where coastal development was contained by barrier beaches, there was considerably less damage than where development had extended closer to the shore. By definition, barrier beaches absorb the brunt of the wave attack and act as natural protective devices. Dunes along a barrier beach protect the area behind them from storm waves and prevent storm waters from flooding the areas behind them. This was evidenced in Duxbury, Massachusetts, where the main part of town was protected from severe and direct wave action by Duxbury Beach, a barrier beach which is primarily undeveloped. The effects of barrier beaches were also evident in the areas behind Plum Island, Massachusetts, where the damage was relatively minor, and in the City of Revere, Massachusetts where Nahant partially absorbed the force of wave attack. In Revere, although damage was extensive, it was primarily due to high flood waters and not to the velocity of direct wave action.

The barrier beaches on the east coast of Cape Cod (Nauset Beach, Nauset Split and Ballston Beach), however, were overwashed. Large amounts of the overwash sediment were deposited on the inner sides of these beaches. In many instances, this action added width to the beaches which had previously been narrowing due to normal erosion. It was estimated that during the coastal storm, cliff erosion along Cape Cod was equivalent to approximately two to three times the annual rate. (Ref. 8)

In Marshfield, a large quantity of sand was eroded at Rexhame Beach and a large dune between the beach and lowland behind it was breached. In Hull, the Metropolitan District Commission has estimated that 50,000 tons of sand was eroded at Nantasket Beach. Other erosion estimates of the M.D.C. are: 5,000 tons each at M Street Beach and Pleasure Bay Beach in Boston, 10,000 tons at Revere Beach in Revere and 20,000 tons at Lynn Beach in Lynn.

Local officials indicated that Plum Island suffered more extensive sand erosion from the storm than by other previous intense storms. This was corroborated by documentation from the City of Newburyport. Although local officials stated that significant damage was done to shellfish beds and salt marshes in the estuaries behind Plum Island, Plum Island, being a barrier beach, prevented much greater environmental damages by absorbing and dissipating the brunt of the storm surge in its sand dunes.

A large percentage of the sand which is eroded from barrier beaches and dunes is transported and deposited offshore, forming sand bars. These sand bars help to dissipate wave energy offshore during a storm and eventually the sand is transported back to the shore area. In some areas, however, this newly deposited sand buried and destroyed shellfish beds. In addition, a considerable number of clams, crabs and lobsters were washed up along the shoreline, particularly along the coast of Plum Island in Ipswich and Newbury and Nantasket Beach in Hull. Estimates of the dollar loss resulting from the destroyed shellfish beds and shellfish have not yet been made.\*

While there was an immediate monetary loss resulting from the erosion of beach areas, the burying of shellfish beds and the washing ashore of shellfish, the impact is not considered irreversible. Beaches can be replenished in many instances by the action of low waves of long periods. New shellfish beds will be formed to take the place of those destroyed.

#### V. Assessment of Damages

The Assessment of Damages presents in tabulated form the costs and losses associated with the storm, both direct and indirect, both man-made and natural. A loss is damage sustained expressed in dollars and a cost is money expended for other than repairing/replacing a loss. Not all costs and losses, however, can be included at this time because, in many instances, they are either not known or are, at best, estimates only. All tables discussed in this report are located in Appendix B.

Information obtained from the American Red Cross on damage to dwellings and commercial establishments is presented in Table 1. Where personal interviews with municipal representatives indicated discrepancies, the figures supplied by the municipal representatives were used.

Information obtained from F.D.A.A. on losses to municipally-owned man-made structures and indirect costs to the Federal government in each of the 46 communities is given in Tables 2a to 2f. These funds are associated with approved project application requests made by the municipalities.

\*At the time of publication of this report, the Massachusetts Department of Fisheries Wildlife & Recreational Vehicles, Division of Marine Fisheries, advises that they have been unable to make this estimate.

Tables 3a to 3f present information from the F.D.A.A. on losses to state-owned and some private man-made structures and indirect costs to the Federal government in many of the 46 communities. These tables break down funding by municipality only where it is possible to do so. Table 4 lists F.D.A.A. reimbursements to Massachusetts where it is not possible to break down the allocation of reimbursement by municipality. There are no such reimbursements associated with the storm in New Hampshire.

Table 5 lists the breakdown by community of one expenditure of funds by the American Red Cross. Where costs were allocated by chapter and not by community, they were arbitrarily divided.

Information on damage to both public and private property in each of the municipalities in the two states is presented in Tables 6a to 6tt. The public damage includes costs and losses not reimbursed by F.D.A.A., damage to the shoreline, and other miscellaneous damages. They also contain data on private damages where the information was available.

An unsuccessful attempt was made to enact legislation in Massachusetts in 1978 to grant abatements from property taxes to those individuals and companies whose buildings were either damaged or destroyed as a result of the storm. Another attempt will be made early in 1979. Should it succeed, municipal revenue loss will have to be added to this section.

Table 7 presents a summary of Federal expenses to both states as a result of the storm. These estimates are for all the counties covered by the President's Disaster Declaration and could not be further broken down by community. Although some communities which received assistance are not coastal and therefore not included in this study, the majority of costs and losses in this table reflect the storm's impact along the coast. Individual Assistance is that provided to persons and their families, which must be distributed on an equitable basis according to need. "Federal public assistance is that part of the emergency or major disaster relief program in which the Federal Government supplements the efforts and available resources of States and local governments to restore public facilities or services." (Ref. 16) Mission Assignment Costs refer to funds allocated for inspection and review of claims made on the damage survey reports. These values are current through the end of September, 1978. A conversation with a representative of the Federal Insurance Administration indicates that approximately 98 percent of the F.I.A. costs appear to be related to the storm with the remaining 2 percent related to damages from other storms.



The F.I.A. costs are not total damage costs, but costs to buildings and contents for which insurance was purchased. In many instances, no insurance was purchased; therefore, these values are understandably low in relation to total private damages. It is doubtful that a truly accurate accounting of private damages can ever be made.

Table 8 lists all other costs which cannot be broken down by community.

Tables 9a to 9t list all costs and losses from all sources for the storm by community, where the information was available and could be broken down by town.

Table 10 is a summary of the costs and losses for each state using the format of Table 9. This information was derived from Tables 4, 7, 8 and 9 and was incorporated into the appropriate categories where possible. It could not be determined that the values listed in Table 9 under Private Property Loss were already included in Table 7 under Home and Personal Loans, Business Loans, or Federal Insurance Administration. Therefore, the values from Table 7 were used as totals. This was done in order to prevent any possibility of duplication of private losses. The costs of U.S. Army and the Massachusetts National Guard, as shown in Table 8, are not reflected in Table 10 because these costs were for the entire state of Massachusetts.

Table 11 is the consolidated summary of costs and losses for the entire study area.

## VI. Actions and Participation

The severity of the storm resulted in the interaction of governmental agencies at the Federal, State and municipal levels. Within a short period of time, direct coordination and/or control among the agencies was established and functioned under very difficult and trying conditions.

Chains of command were established beforehand or within hours. The tasks of aiding and assisting individuals and providing for food, shelter and medical care were underway even before dark fell on Monday. These chains of command are listed in Tables 11 through 14, located in Appendix B.

Authorization to participate in aiding and assisting both with manpower and funds at the Federal level is P.L. 93-288, known as the 'Disaster Relief Act of 1974.' It empowers the President to issue either a Declaration of Emergency or a Declaration of a Major Disaster. An emergency condition is one "...which requires Federal emergency assistance to supplement State and local efforts..." (Ref. 17) A major disaster is one "...which, in the determination of the President, causes sufficient severity and magnitude to warrant major disaster assistance under this Act, above and beyond emergency services by the Federal Government...." (Ref. 17)

In Massachusetts, Chapter 639 of the Acts of 1950 empowers the Governor to declare a State of Emergency. With the issuance of the declaration, he assumes direct control and responsibility of all State and municipal agencies within the area so considered. In New Hampshire, RSA (Revised Statutes Annotated) 107 of the Acts of 1949 provides for the Governor to declare a State of Emergency resulting from a natural disaster.

The Federal Disaster Assistance Administration coordinates most Federal agencies in collecting and disseminating information. Reimbursement for repairing municipal, State and some private property is made through approval of estimates submitted on Project Application Forms. Also, where Federal employees from other agencies are used in evaluating damage survey reports, the costs of their utilization are included in F.D.A.A. funding.

Much of the funding came from regular budgets of the particular agency. However, funds were made available from the President's Disaster Relief Fund. Items included in that fund are:

| <u>Item</u>                        | <u>Massachusetts</u> | <u>New Hampshire</u> |
|------------------------------------|----------------------|----------------------|
| Temporary Housing                  | \$ 12,500,000        | \$ 332,800           |
| Disaster Unemployment & Assistance | 300,000              | 12,320               |
| Individual and Family Grants       | 4,000,000            | 42,000               |
| Crisis Intervention                | 461,526              | 0                    |
| FCO Mission Assignment             | 50,000               | 22,000               |
| Public Assistance                  | 20,691,695           | 659,190              |
|                                    | <u>\$ 38,003,221</u> | <u>\$1,068,310</u>   |

In Massachusetts, the Governor designated the office of the Lt. Governor to be the overall coordinating unit for all agencies within the Commonwealth. Whereas the Governor directed activities, the Lt. Governor collected and disseminated information.

In New Hampshire, the Governor directed that all agencies report to the office of the Adjutant General of the National Guard.

## VII. Recovery

### a. Massachusetts

On 6 February 1978, Governor Dukakis declared a State of Emergency in Massachusetts and activated the Massachusetts Army National Guard to assist the overburdened State and local authorities in snow removal, in emergency rescue and evacuation operations and in patrolling the streets to prevent looting.

On 7 February 1978, due to the severity of the storm which stranded thousands of people and destroyed hundreds of homes along the coast, Governor Dukakis called the entire Army National Guard to State duty and banned all but emergency vehicles on state roads. This ban remained in effect until Sunday, 12 February 1978, for most towns in eastern Massachusetts and until Tuesday, 14 February 1978 for Boston. This ban, for all practical purposes, closed all businesses and industries in eastern Massachusetts for that week.

On 7 February 1978, President Carter declared a State of Emergency in Massachusetts and ordered that Regular Army units be dispatched to Massachusetts to aid in snow removal and rescue operations.

On Wednesday, 8 February 1978, the National Guard, State and local authorities continued cleanup and rescue operations as the Regular Army began air-lifting its units into Massachusetts to aid in snow removal and storm recovery.

By Wednesday evening, the first Regular Army units with their heavy-duty snow removal equipment arrived in Boston. These units remained in Massachusetts through Sunday, 12 February 1978, during which time they concentrated on snow removal and cleanup operations along the coastline in the metropolitan Boston area.

Although the Regular Army assistance ended on 12 February, the National Guard, together with state and local authorities, continued initial cleanup operations until Sunday, 19 February 1978. By then, most initial cleanup operations had been completed. The Army National Guard was then released from State duty.

On Friday, 10 February 1978, President Carter issued a Declaration of a 'Major Disaster' for Massachusetts, thus providing Federal assistance through the F.D.A.A. to Massachusetts. On the following Tuesday, 14 February, President Carter issued a Declaration of Disaster for

Barnstable, Bristol, Dukes, Essex, Nantucket, Norfolk, Plymouth and Suffolk Counties in Massachusetts. That same day, the F.D.A.A. began the process of long-term recovery from the 'Great Blizzard of 1978' by opening the first of several Disaster Assistance Centers in the coastline communities in order to assist the local communities and individuals in preparing damage estimates and in applying for Federal assistance to rebuild and restore their homes, businesses and towns.

The Disaster Assistance Centers and Follow-up Assistance Service Teams remained in operation throughout the month of February and most of March assessing damage and processing applications for disaster assistance funds. These centers finally closed on 24 March 1978, but the long-term recovery was far from completed.

Throughout the spring and summer months the F.D.A.A., with the cooperation of the Massachusetts Disaster Recovery Team, continued processing applications for disaster assistance and counseling individuals seeking assistance and began distributing disaster assistance funds to eligible applicants. Most small restoration and reconstruction projects were quickly funded and by September, 1978, most communities were restored to pre-storm conditions. Only major restoration and reconstruction projects, such as seawalls, roadways, and some buildings, currently remain to be done. These major projects may not be completed until the end of 1980.

In addition to repairing physical damage to structures and the coastline itself, the Federal Government and the Commonwealth of Massachusetts recognized the need to aid the mental problems and emotional needs of individuals who could not adequately cope with what the storm had done to their lives. The Massachusetts Department of Mental Health operated during the storm to deal with emergency needs of mental health programs. Crisis intervention teams were established within the Disaster Assistance Centers.

On 8 March 1978, the National Institute for Mental Health, under Section 413 of P.L. 93-288, awarded a grant (Contract No. 278-78-0030) to the Massachusetts Department of Mental Health and Research for Social Change, Inc. to establish 'Project Concern', a six-month program to aid the victims of the storm. Representatives of 'Project Concern' both received referrals and actively sought out individuals who needed help. In August, when it became apparent that six months was too short a time span, the program was extended for another three months with an additional grant.

#### b. New Hampshire

The cleanup and recovery processes along the New Hampshire coastline, as expected, very closely corresponded to those processes in Massachusetts.

On 6 February 1978, Governor Thomson declared a State of Emergency in New Hampshire and activated the State Emergency Plan in order to battle the snowstorm. The State Emergency Plan provided for the implementation of the Army National Guard to assist the State and local authorities in snow removal, emergency rescue and evacuation operations and to patrol the streets to prevent looting. The State of Emergency remained in effect until Thursday, 9 February 1978, when Governor Thomson released the National Guard from service and the coastline communities and the State agencies continued cleanup activities.

On 10 February 1978, after Governor Thomson determined that effective storm recovery was beyond the capabilities of the State, he requested President Carter to declare a 'Major Disaster' for the State of New Hampshire.

The state and local authorities continued cleanup operations throughout the following week in anticipation of Federal assistance arriving to begin the long-term recovery process.

On 16 February 1978, Federal assistance was assured when President Carter issued a Declaration of a 'Major Disaster' for New Hampshire and a Declaration of Disaster for Rockingham County, thus providing Federal assistance through the F.D.A.A. The F.D.A.A. began the process of long-term recovery on Tuesday, 21 February 1978, by opening Disaster Assistance Centers in the New Hampshire coastline communities. The centers assisted both the local authorities and individuals in preparing damage estimates and in applying for Federal assistance to rebuild and restore public and private properties. These Disaster Assistance Centers remained open throughout that week and closed on Saturday, 26 February 1978, after assisting each coastal community in New Hampshire.

As previously described for Massachusetts, the F.D.A.A. worked throughout the spring and summer months counseling individuals seeking assistance, processing applications for disaster assistance and distributing disaster assistance funds to eligible applicants.

While most of the small restoration and reconstruction projects were quickly funded and have already been completed, the long-term recovery process will probably continue through 1980 in order to complete the major restoration and reconstruction projects.

Although a few major projects remain to be completed, all the New Hampshire coastal communities were mostly restored to pre-storm conditions by the end of the summer of 1978. Thus, the 'Blizzard of 1978' had little detrimental effect to the New Hampshire seashore tourist industry.

### VIII. Photography

In the aftermath of the storm, many photographs were taken to record the visible physical damage caused by the water. While it was not the intent of this study to gather and document damage pictures; during the course of compiling cost data, a substantial number of photographs were acquired. Included in this collection is a set of low level aerial obliques, shot from a helicopter on 11 February, showing very clearly the price which is paid by the "first line of defense" in the coastal area. (See cover photograph) These and other pictures are indexed to locations on USGS Quad sheets, and are on file in the Flood Plain Management Section, Planning Division, New England Division (NED), Corps of Engineers.

There was no comprehensive, low-level controlled vertical photography taken immediately after the storm, nor was there similar photography showing the "before" condition. These two sets of imagery would have greatly assisted insurance adjusters and public officials in trying to quantify the impacts of the coastal storm.

As an attempt to preserve visual evidence of the storm for future use, NED procured color aerial photography of the open-facing coast from the Cape Cod Canal north to the New Hampshire-Maine line. This photography was flown in late September, at an altitude of 4500 feet, to full photogrammetric specifications. In addition to documenting whatever physical evidence of the storm still remained, this photography constitutes a baseline, or "before" condition for the next coastal event. If and when required, selected portions may be extracted and mapped photogrammetrically. Combined with re-flying and re-mapping after a major storm, the opportunity for "before-after" overlays will allow a quantitative evaluation of physical damage. In effect, the photography is insurance, in that it allows the establishment of a baseline condition on a selective basis.

Two sets of color contact positives were printed, at a scale of 1" = 750'. One set was provided to the two state coordinating offices; viz, Special Disaster Recovery Team (Massachusetts), and Office of Comprehensive Planning (New Hampshire). The other set, and the rolls of color negatives, are on file at the Basin Management Branch, NED.

## IX. Summary of Findings

In the aftermath of devastating coastal storm of February 6, 7, 1978 there became apparent that a need existed for an in-depth evaluation of the storm's effect upon the coastline. As a means of documenting these effects the New England Division approached the states of Massachusetts and New Hampshire with a proposal. The intent was to re-direct funds, previously earmarked for water supply studies through Section 22 authority (Planning Assistance to States), into a study to document the impact of the storm on the coastal communities of the two states. We stressed the importance of gathering and recording data "while the trail was still fresh." Both states readily complied with our requests, and some \$55,000 was committed to this study in July 1978.

The study consisted of two major work items; the first documented costs and losses by community, nature of loss, both direct and indirect; and, the second was an aerial photographic effort to acquire low level, large scale color imagery of the affected coastal reaches of the communities which had sustained major damage.

The "Blizzard of '78", caused nearly \$300 million in flood and wind damage in the 46 coastal communities from Orleans, Massachusetts to New Castle, New Hampshire. This estimate included losses to man-made and natural features and incorporates damages to both public and private property.

Several meteorological and astronomical events combined to produce this intense and devastating storm. A warm, moist, low level, low pressure system from the mid-Atlantic Ocean combined with an intense, high level, very cold, low pressure mass from Canada. The result of this match was a storm with a return frequency close to 100 years and with storm induced tidal surges in excess of 3.4 feet.

The damage in the 46 communities included \$250 million in Massachusetts and \$10 million in New Hampshire with the remaining damage occurring in other communities outside of the 46 studied or unable to split between the two states. Of this damage, almost 80 percent was attributed to property loss both private and public; indirect expenses, such as clean-up, rescue and shelter costs, contributed to the remainder of the damage.

Almost half of the total damage occurred in seven Massachusetts and two New Hampshire communities. The seven Massachusetts communities which were the hardest hit economically were Plymouth, Marshfield, Scituate, Hull, Revere, Lynn, and Gloucester; the two New Hampshire communities were North Hampton and Hampton. These communities are located in areas where the shoreline was perpendicular to the wave approach and/or the development was close to the shoreline. In many cases, the only protection offered to these developed areas were man-made protection devices rather than the natural barrier beaches and sand dunes which existed in other areas.

The collecting of data for this report was more arduous than expected, due mainly to the fact that no central cost accumulation system existed. The data collection process consisted of visits to each of the 46 communities along with over 20 agencies involved in the disaster. In many cases, more than one visit had to be made. In several of the communities, the data was based upon the judgment of a community official. Once the data collection was complete, the costs were broken down into the various categories within the tables. In the distribution of the costs, care was exercised to be sure that costs obtained from different sources were not related to the same area of damage.

The report will facilitate a rational decision making process for evaluating coastal flood plain management alternatives, by making total cost impact data available for analysis. The photography, in addition to recording some of the physical impacts of the storm, establishes a "before" condition for the next coastal event. Since it was flown to photogrammetric specifications, mapping may be produced on an "as needed" basis at a large enough scale to portray erosional effects to the shoreline.



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## APPENDIX A

## APPENDIX A

The figures contained herein describe some of the major physical and temporal characteristics of the storm, as it impacted the Massachusetts and New Hampshire coastline on 6-7 February 1978. In some cases, data outside of the study area is included to provide a range of values.

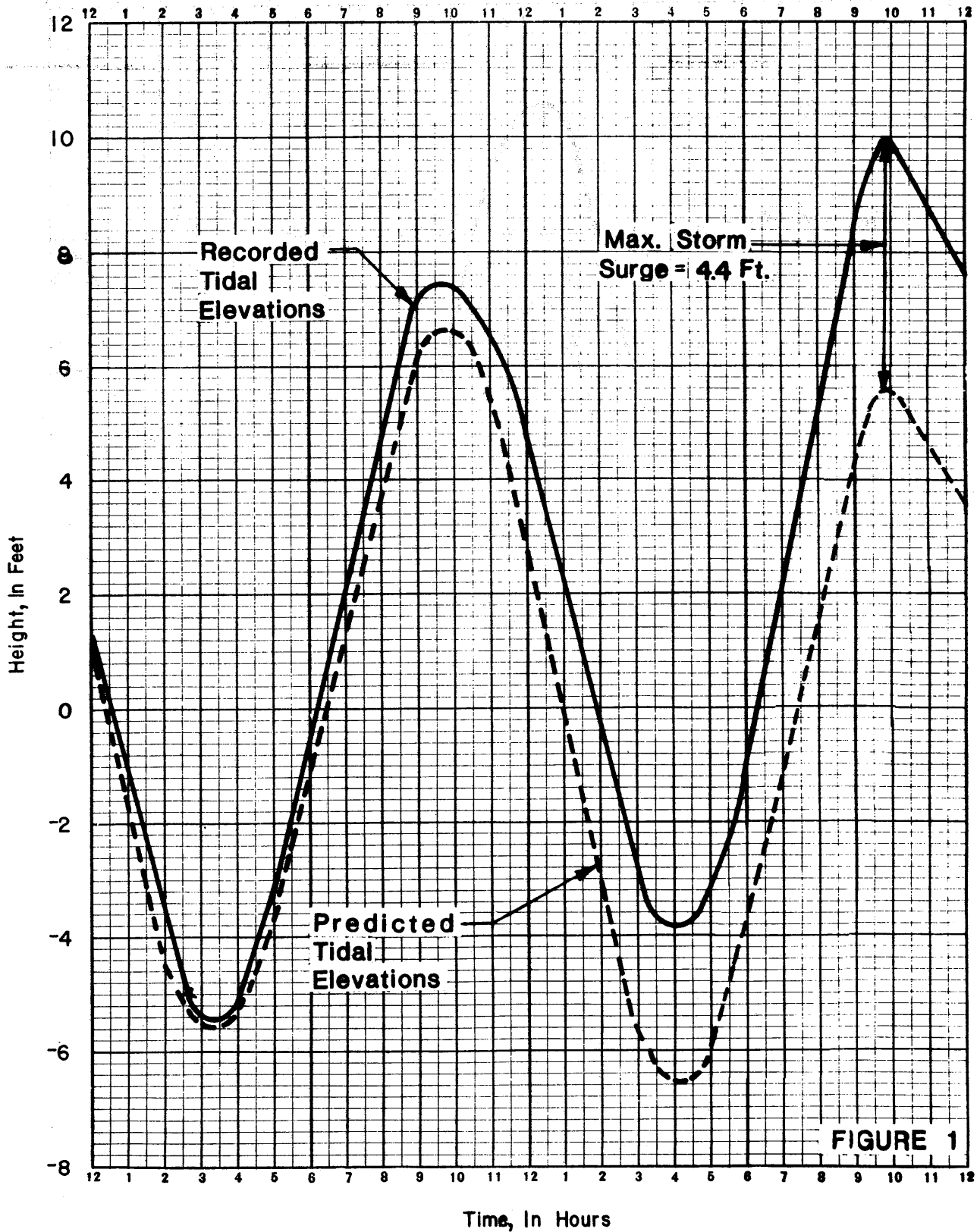
Specifically, the following data is presented:

- FIG. 1-8      Tide Elevations (predicted and observed)
  - at Boston, Massachusetts; Hampton, New Hampshire; Portsmouth and Portland, Maine
  
- FIG. 9,10     Temperature Plots
  - at Providence, Rhode Island; Boston, Massachusetts; Portland, Maine
  
- FIG. 11,12    Barometric Pressure
  - at Providence, Rhode Island; Boston, Massachusetts; Portland, Maine
  
- FIG. 13,14    Cumulative Snowfall
  - at Providence, Rhode Island; Boston, Massachusetts; Portland, Maine
  
- FIG. 15-20    Wind Plots
  - at Providence, Rhode Island; Boston, Massachusetts; Portland, Maine

Tidal Elevations  
Commonwealth Pier, Boston, Mass.

6 FEB. 1978

National Geodetic Vertical Datum Of 1929



Tidal Elevations  
Commonwealth Pier, Boston, Mass.  
7 FEB. 1978  
National Geodetic Vertical Datum Of 1929

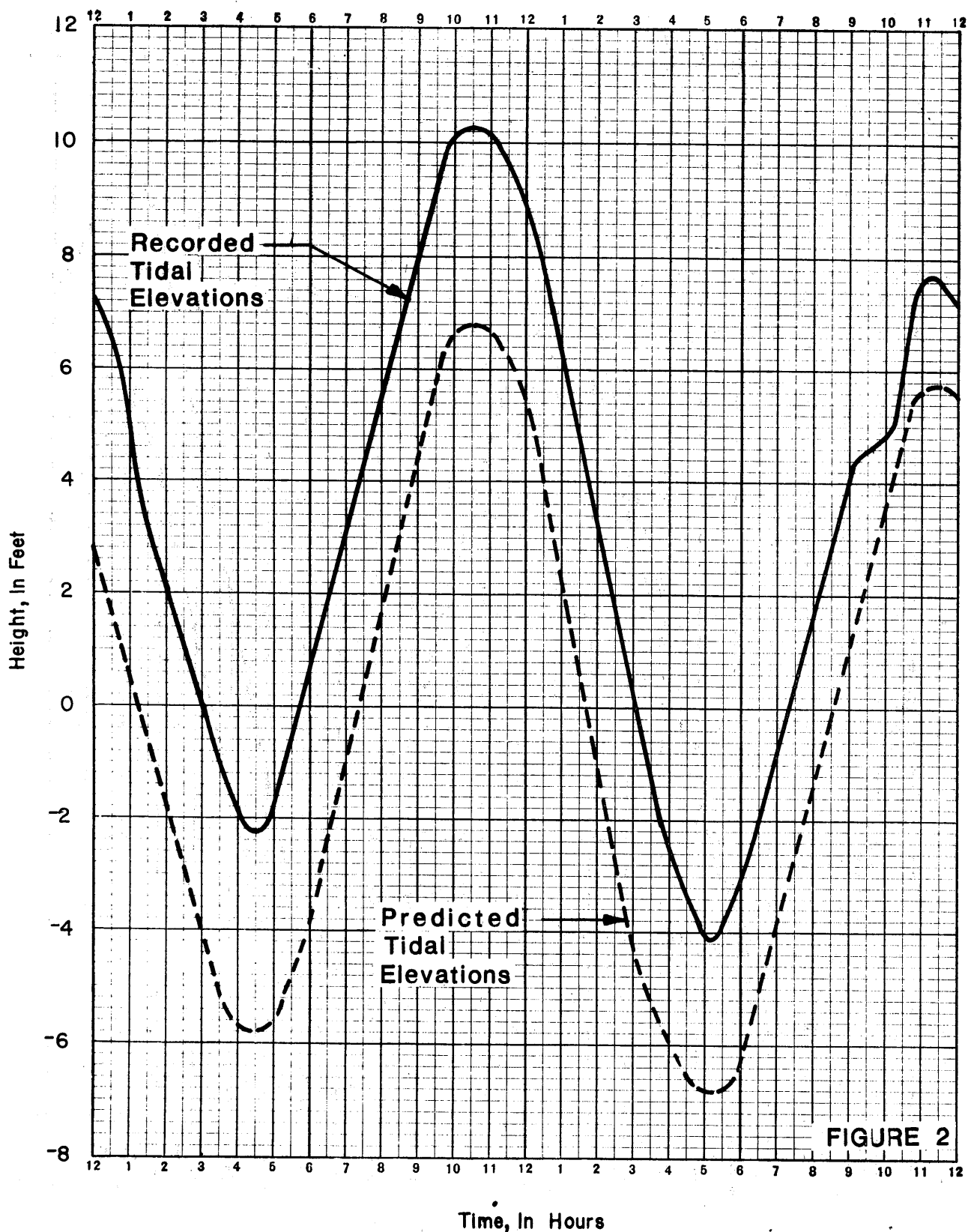


FIGURE 2

Tidal Elevations  
State Pier, Hampton, N.H.  
6 FEB. 1978  
National Geodetic Vertical Datum Of 1929

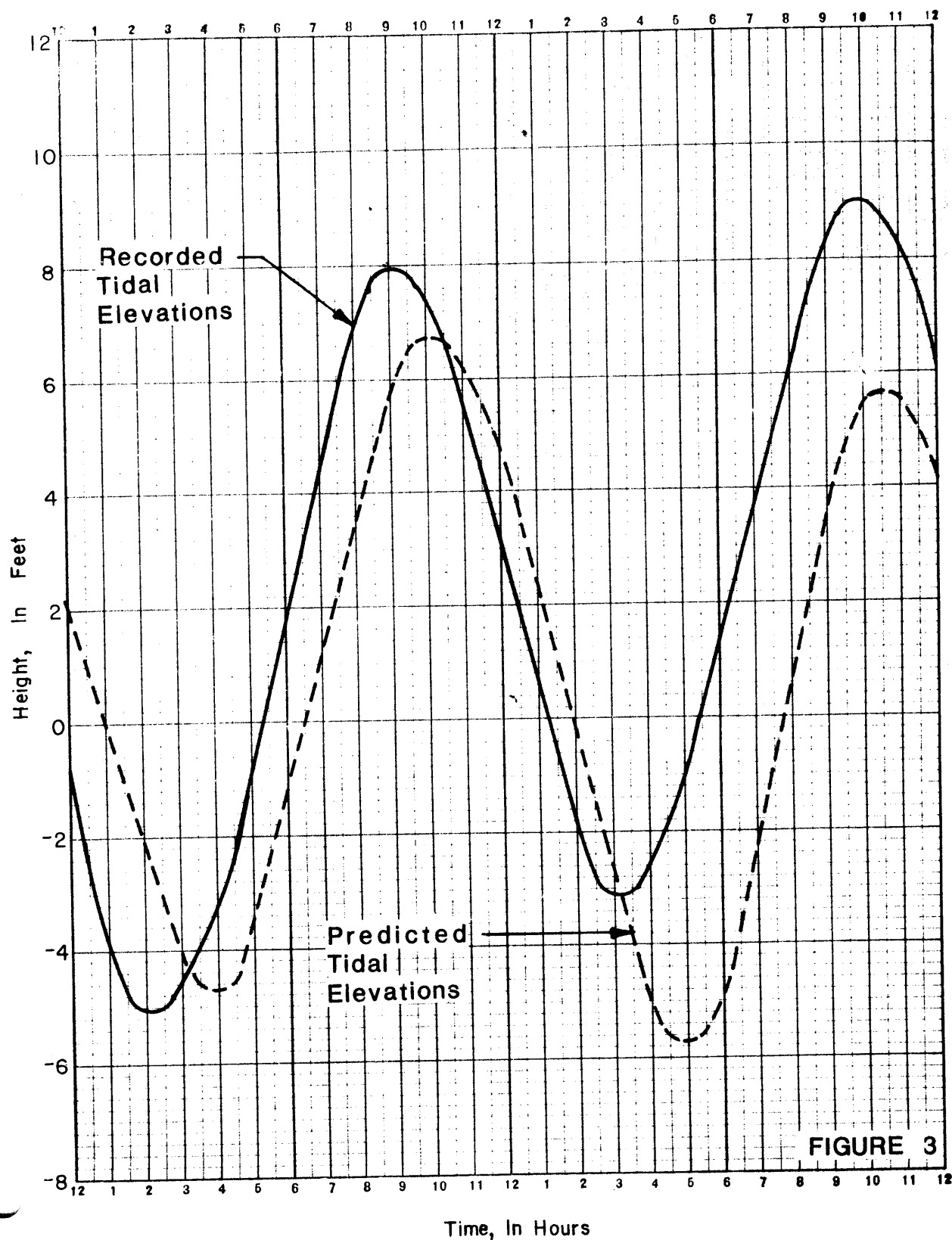
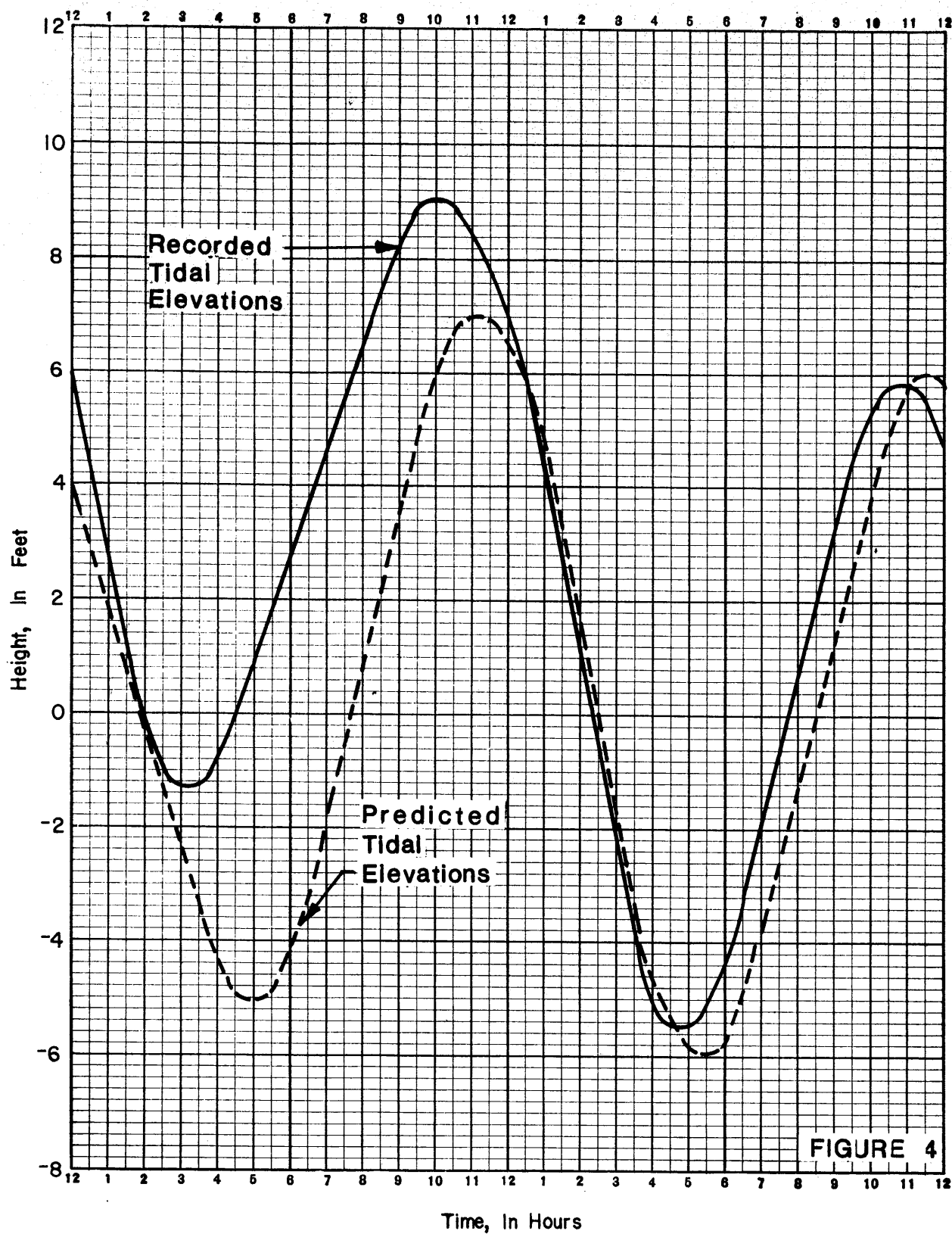


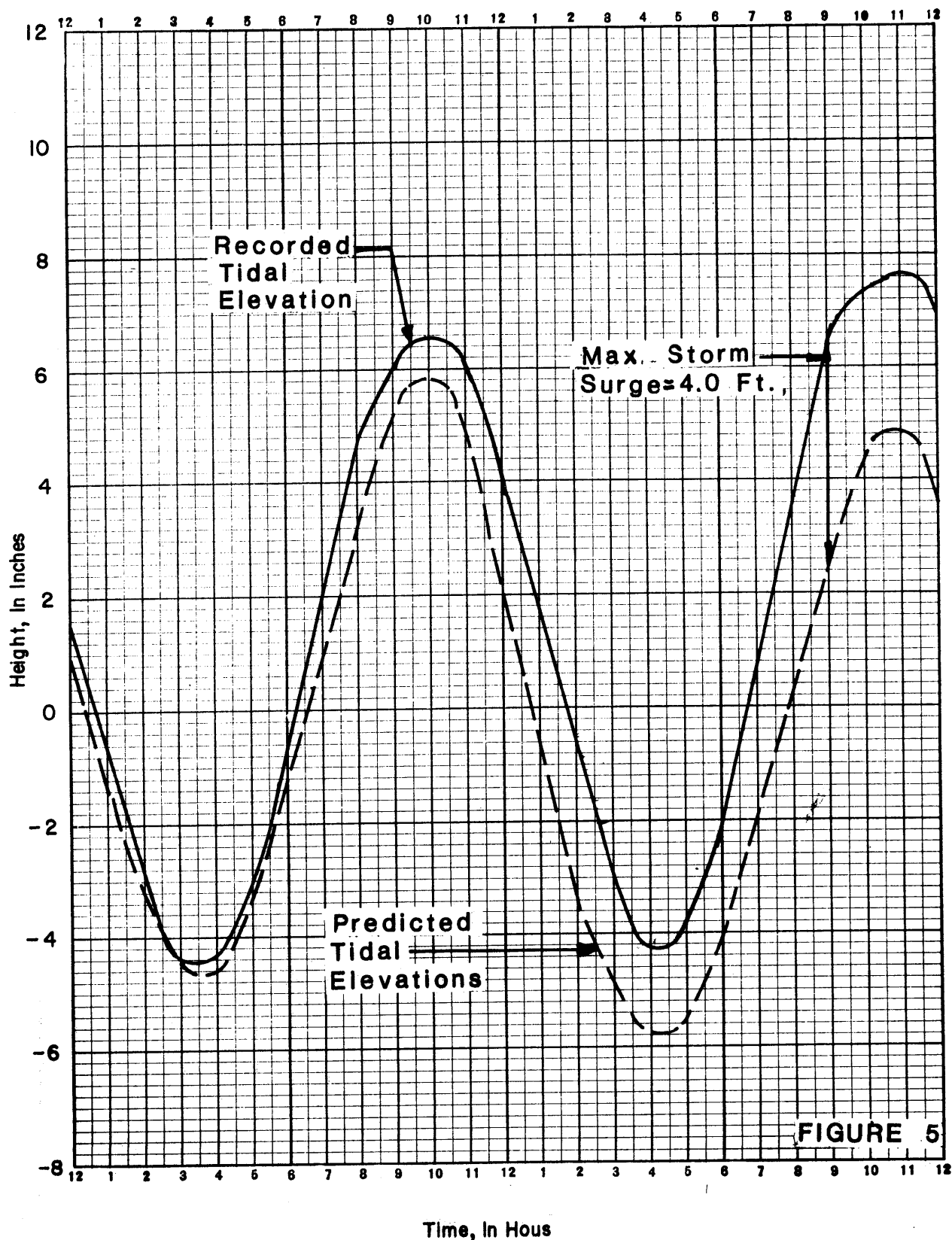
FIGURE 3

Tidal Elevations  
State Pier, Hampton, N.H.  
7 FEB. 1978  
National Geodetic Vertical Datum of 1929

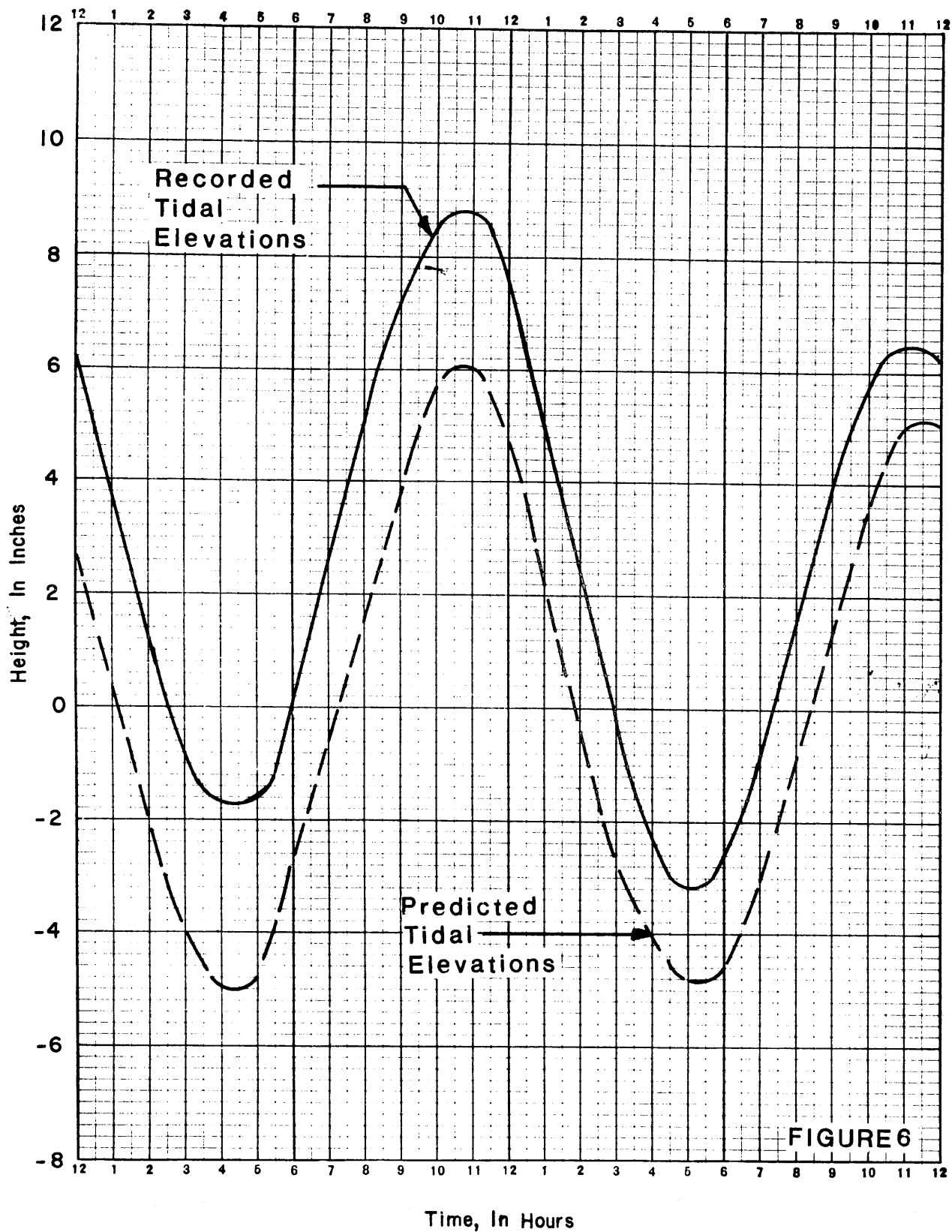




Tidal Elevations  
Berth 2, Seavey Island, Me. (Portsmouth Harbor)  
6 FEB. 1978  
National Geodetic Vertical Datum Of 1929



Tidal Elevations  
Berth 2, Seavey Island, Me. (Portsmouth Harbor)  
7 FEB. 1978  
National Geodetic Vertical Datum Of 1929



Tidal Elevations  
State Pier, Portland, ME.  
6 FEB. 1978  
National Geodetic Vertical Datum Of 1929

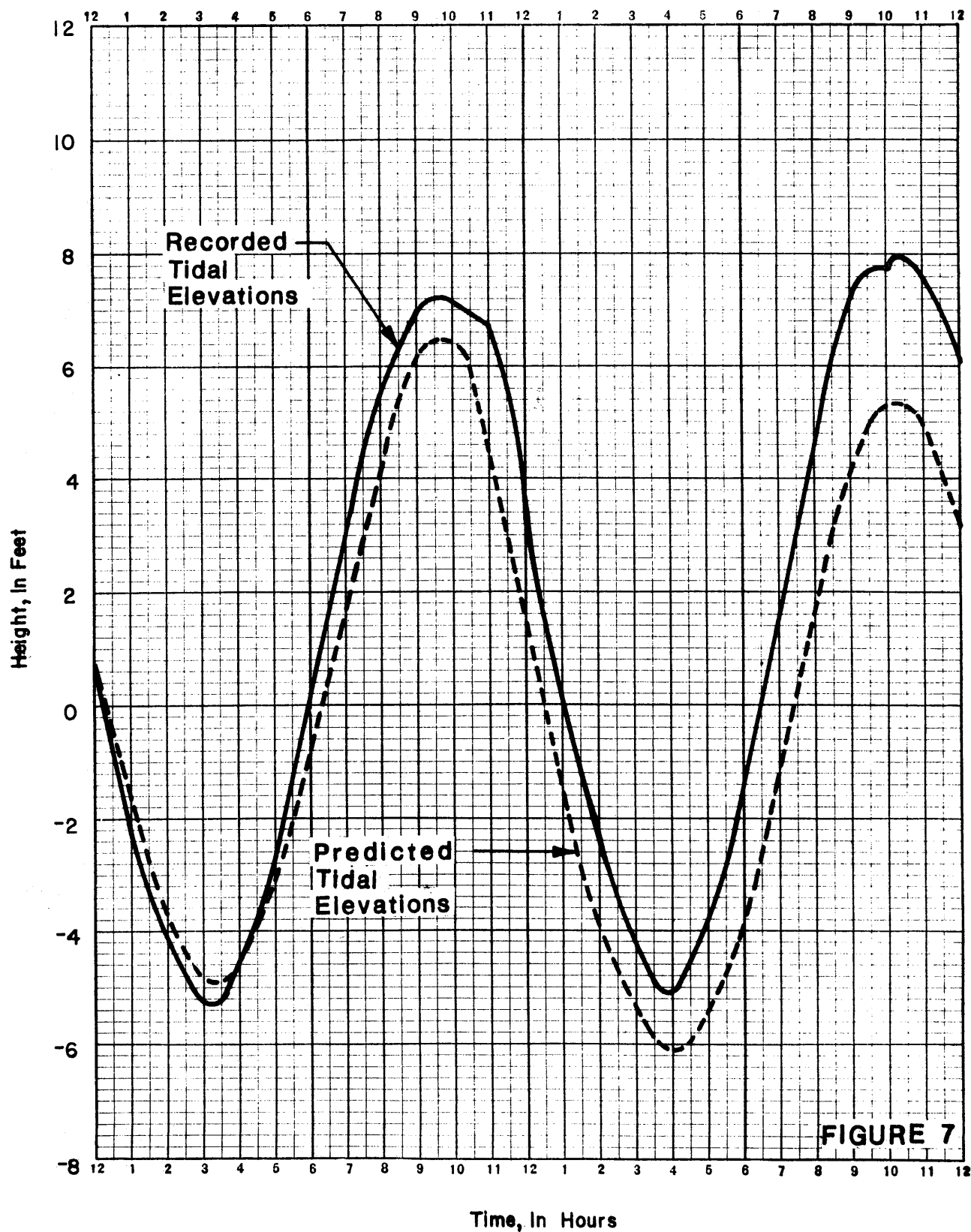
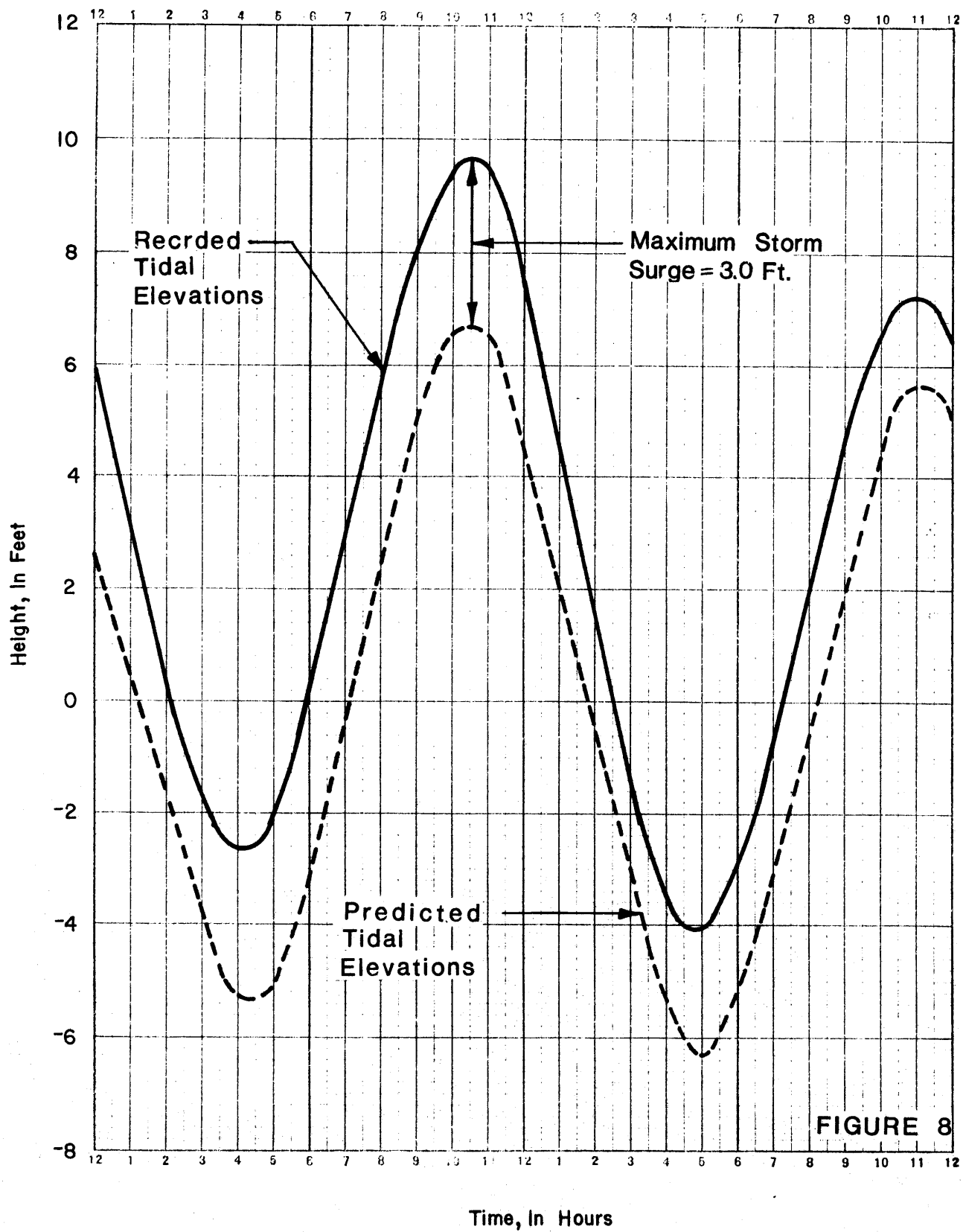


FIGURE 7

Tidal Elevations  
State Pier, Portland, ME.  
7 FEB. 1978

National Geodetic Vertical Datum Of 1929



# Temperature

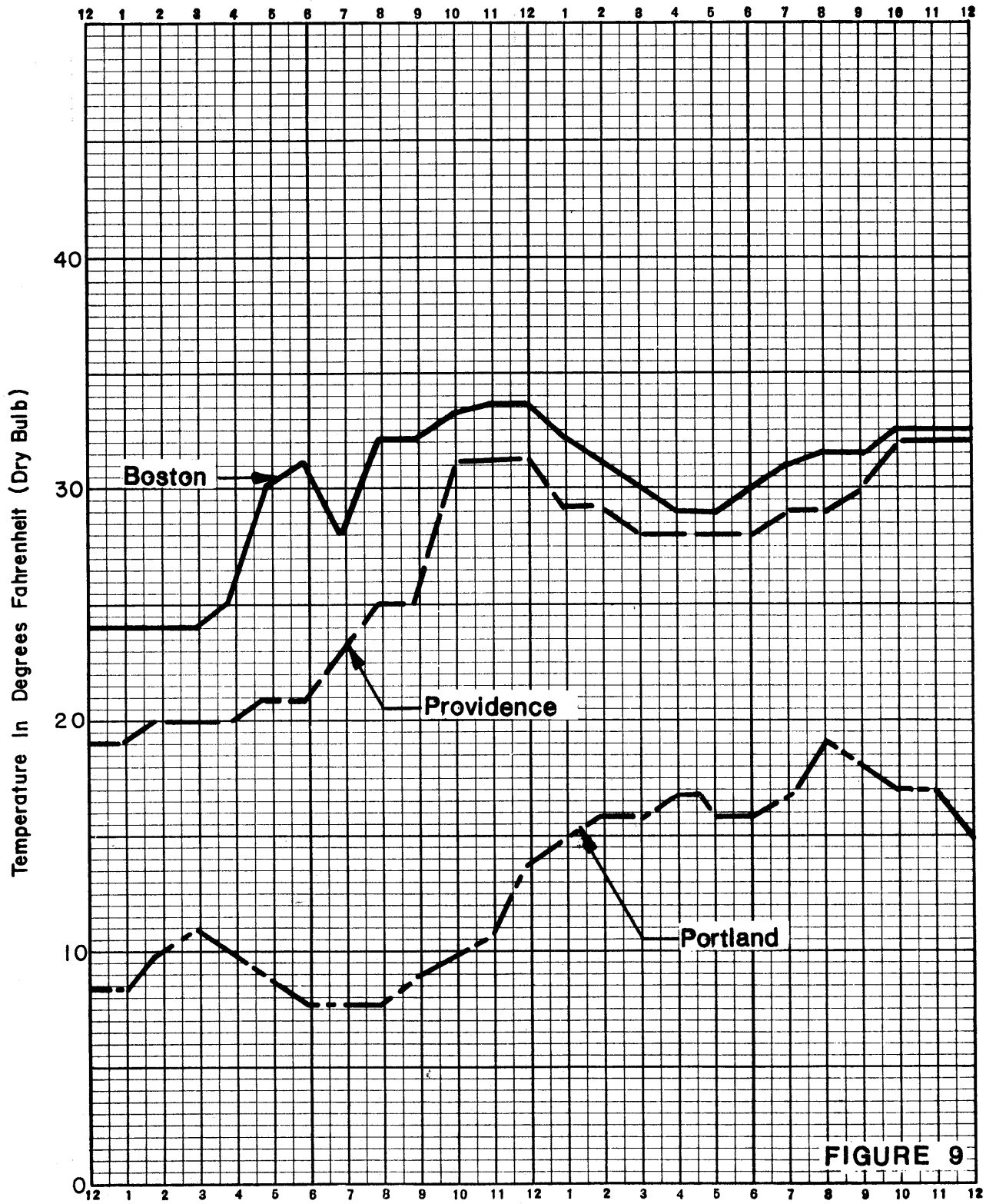
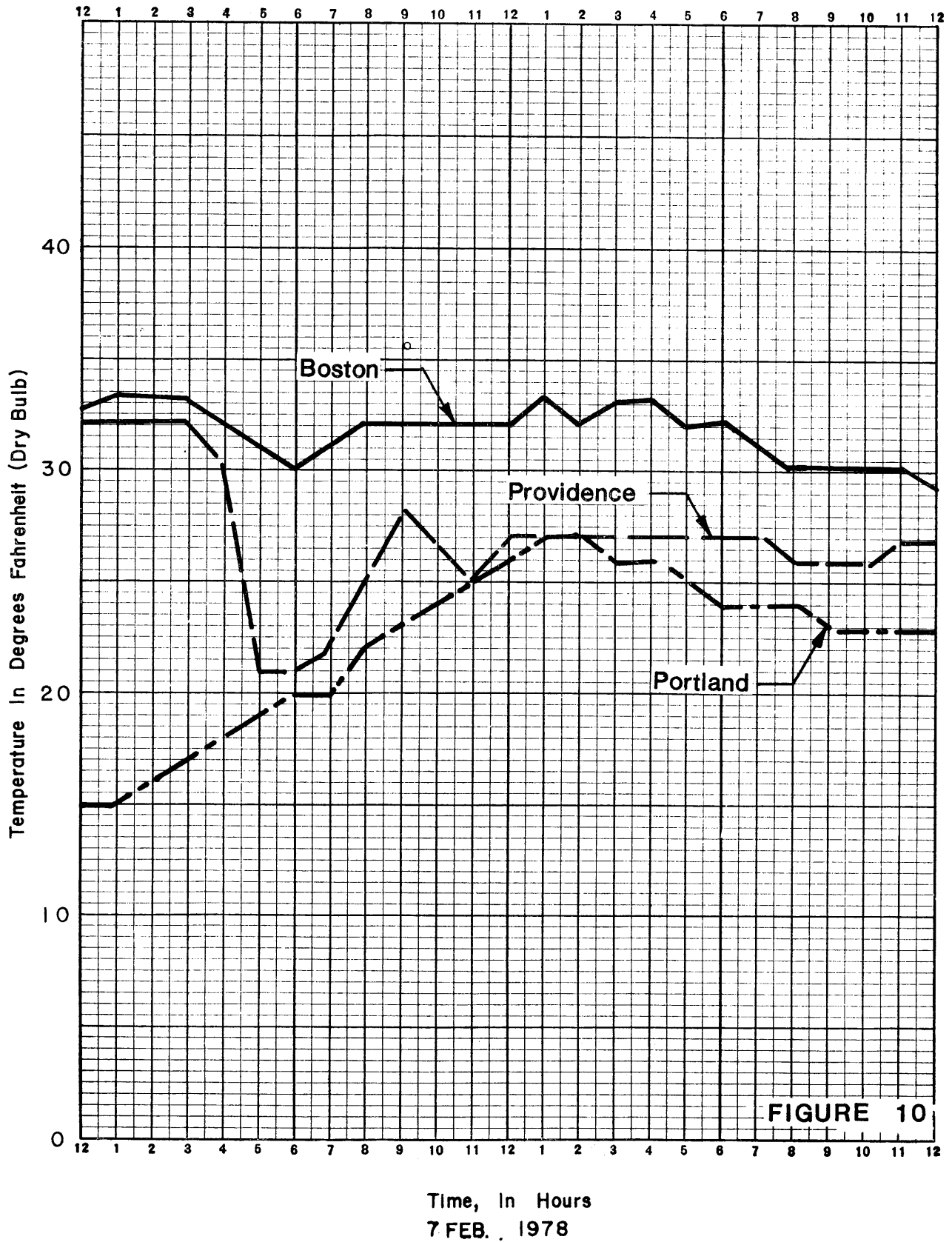


FIGURE 9

Time, in Hours  
6 FEB. 1978

# Temperature



# Barometric Pressure

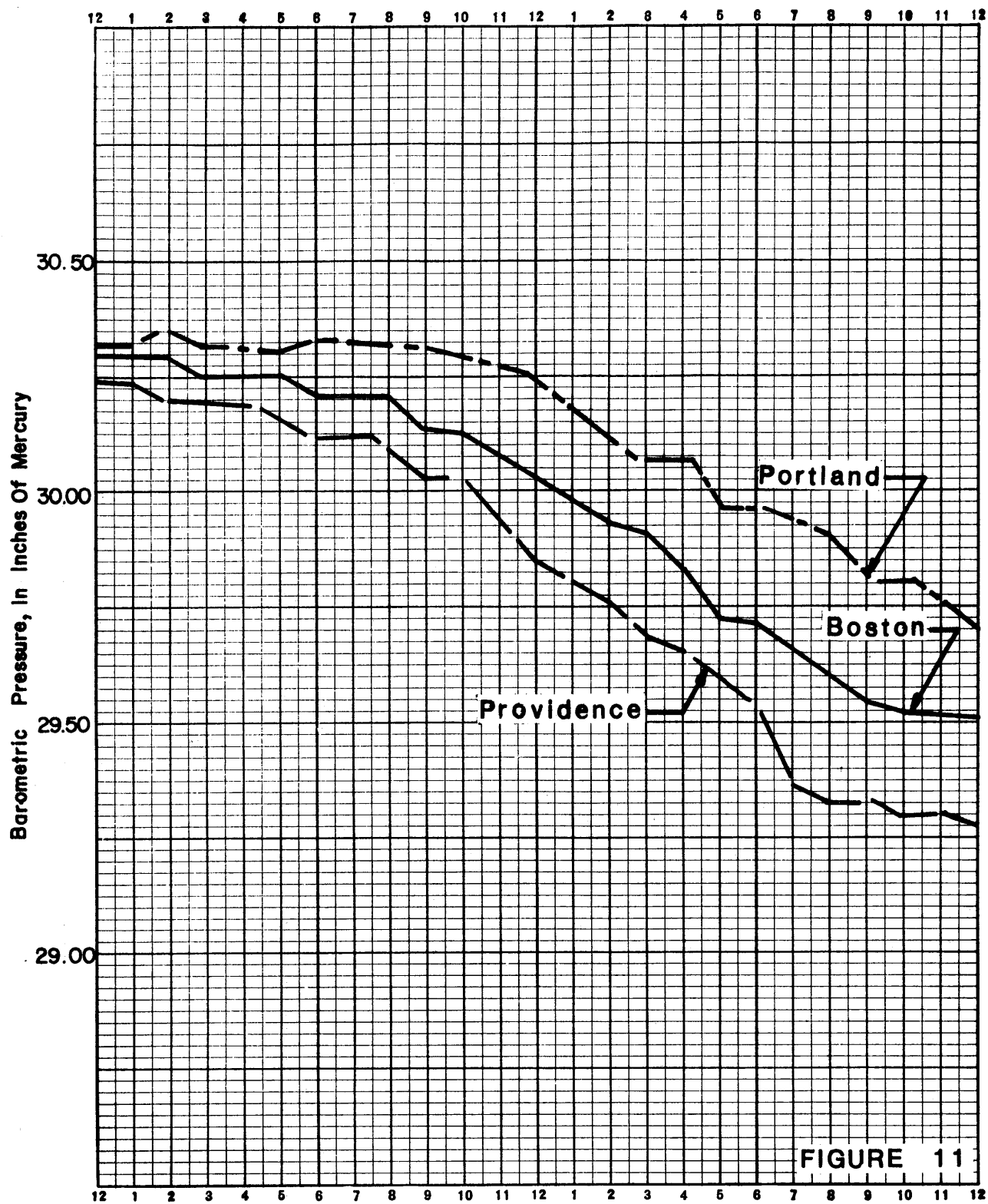


FIGURE 11

Time, In Hours  
6 FEB. 1978

# Barometric Pressure

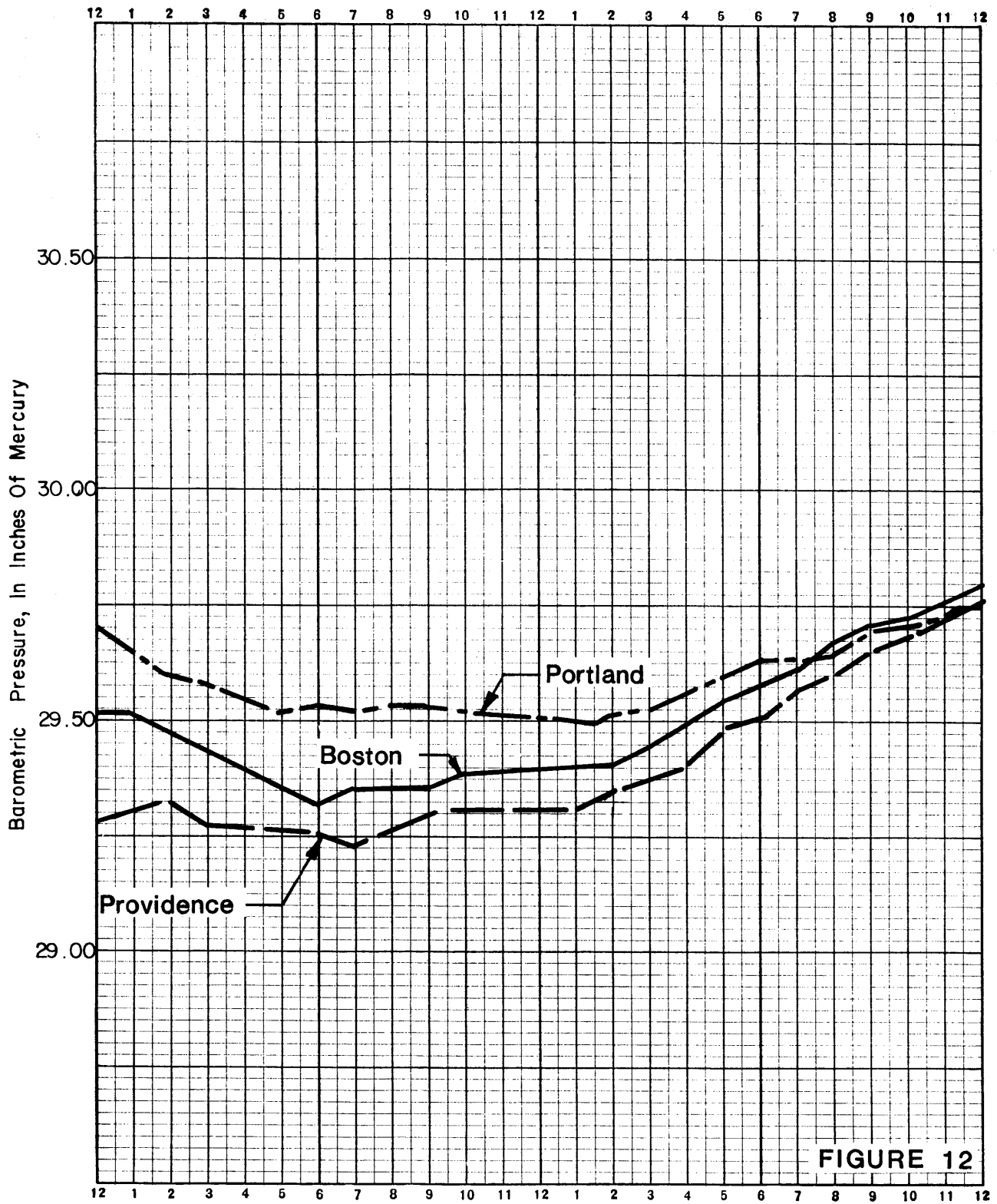


FIGURE 12

Time, In Hours

7 FEB. 1978



# Accumulative Snowfall

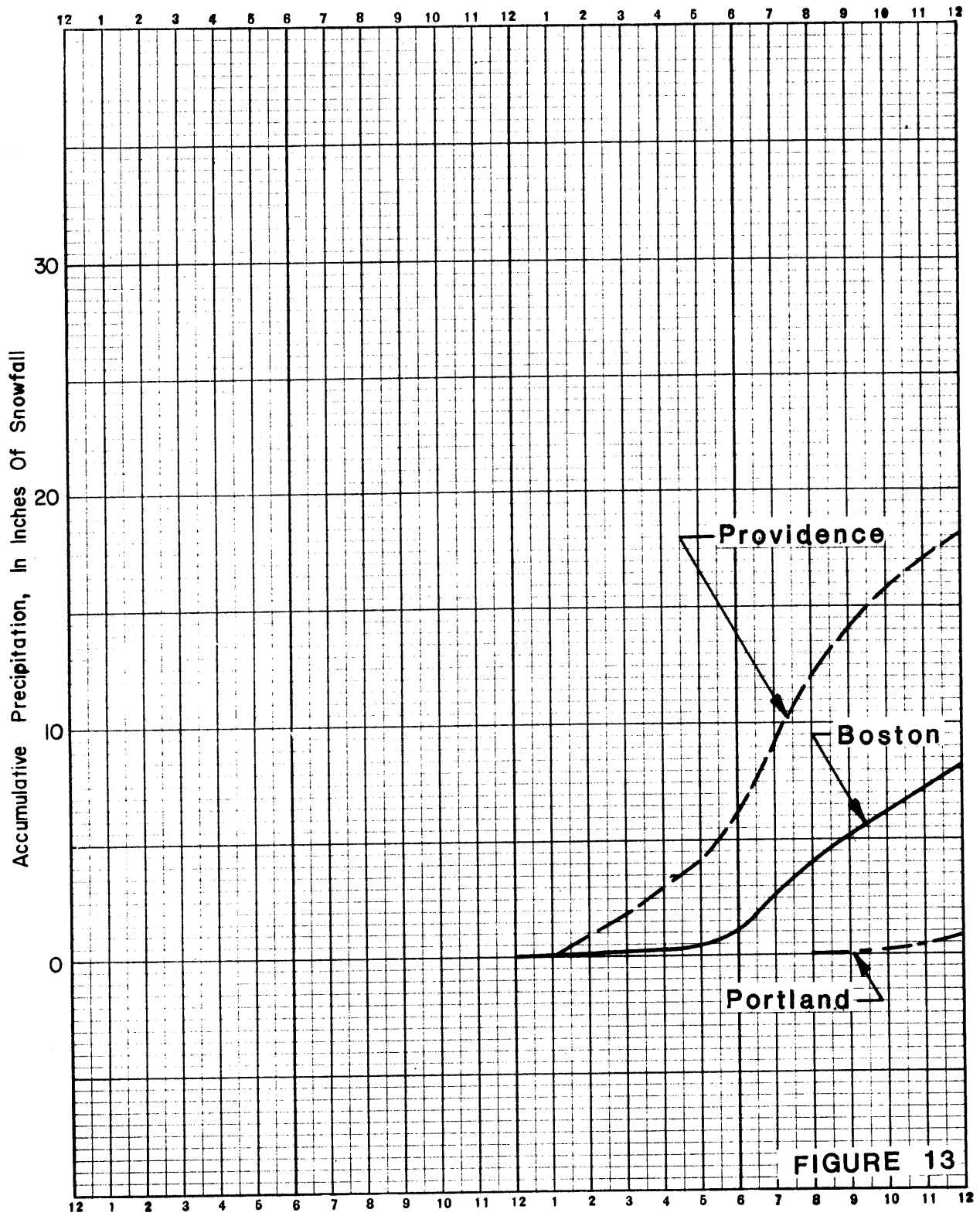


FIGURE 13

Time, In Hours  
6 FEB. 1978

# Accumulative Snowfall

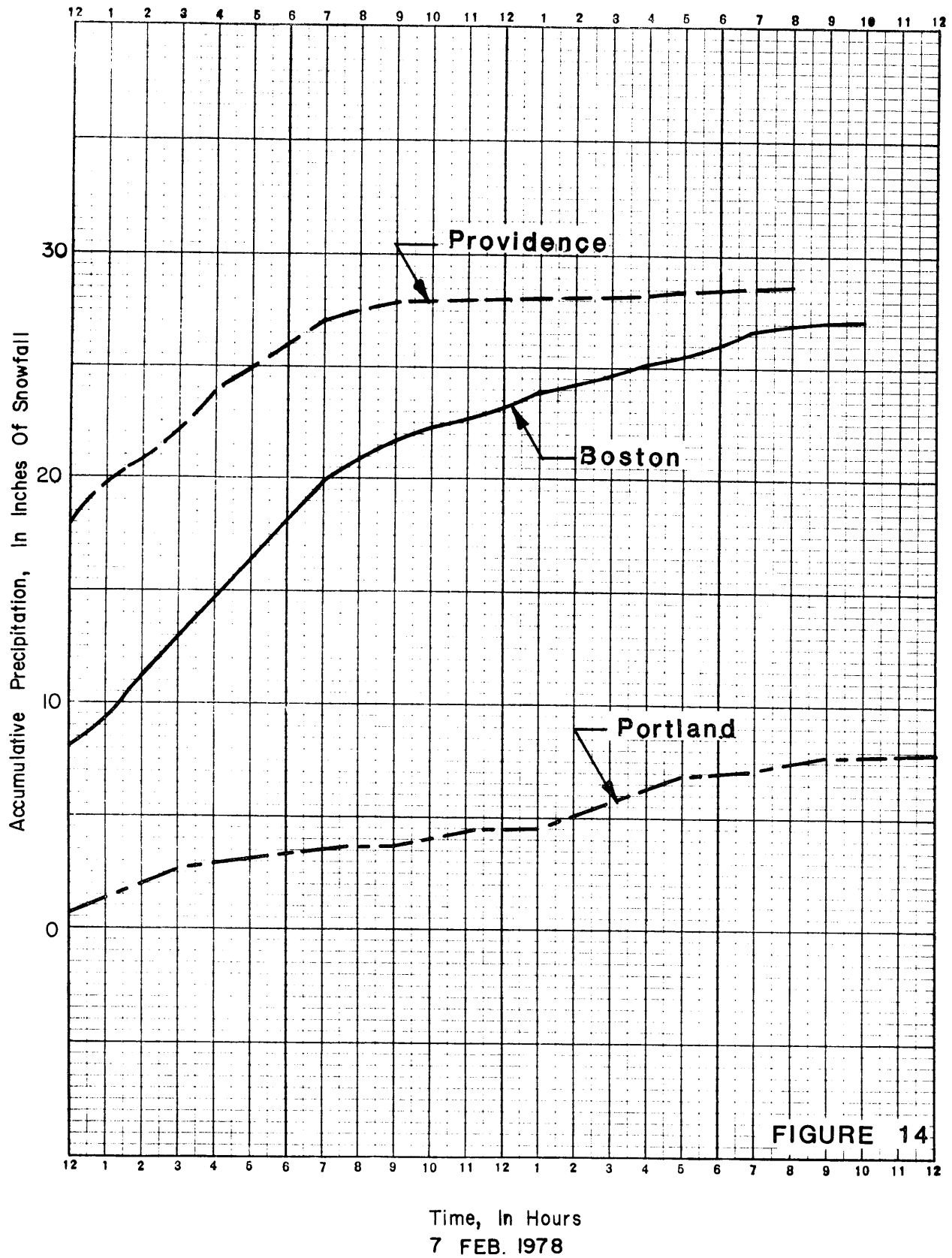


FIGURE 14

Time, In Hours  
7 FEB. 1978

Wind Plot, Providence, Rhode Island 6 February 1978  
Wind Speed Scale: 1" = 10 M.P.H.

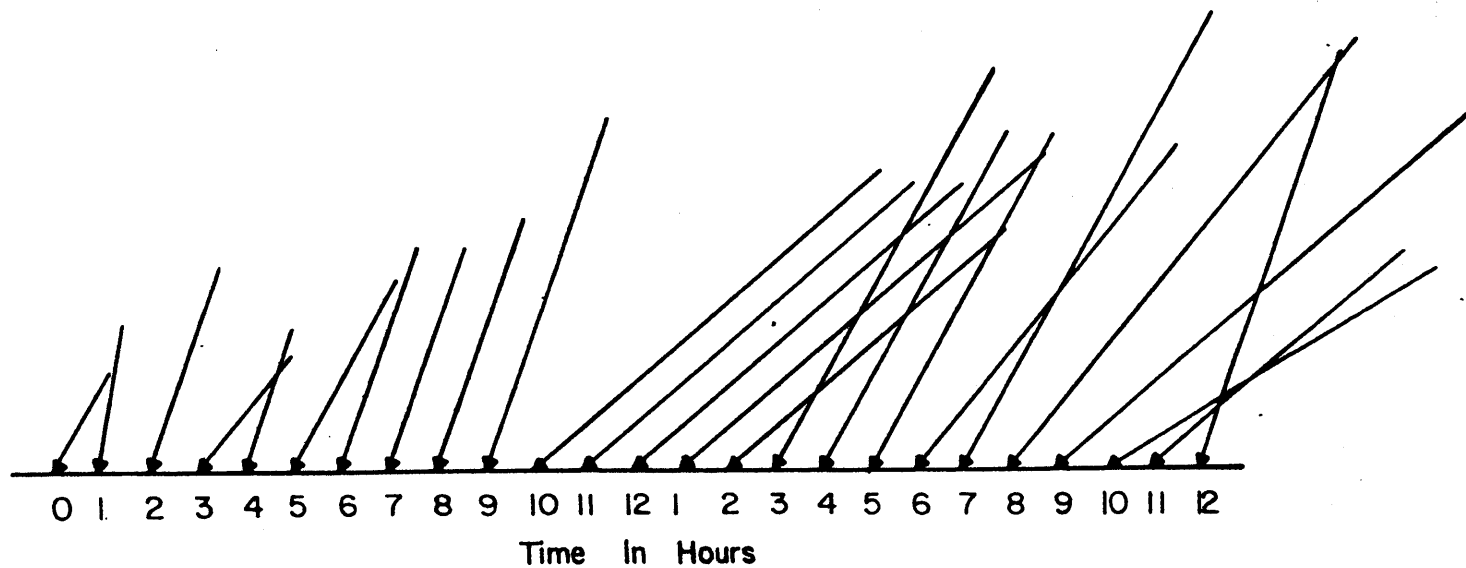


FIGURE 15

Wind Plot, Providence, Rhode Island 7 February 1978

Wind Speed Scale: 1" = 10 M.P.H.

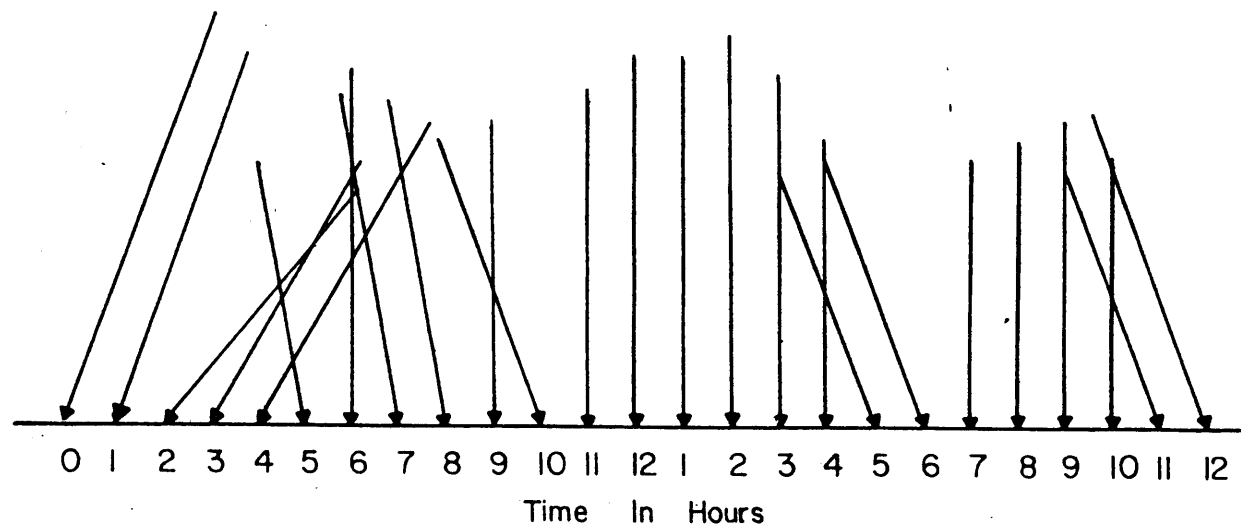


FIGURE 16

Wind Plot, Boston, Massachusetts 6 February 1978

Wind Speed Scale: 1" = 10 M. P. H.

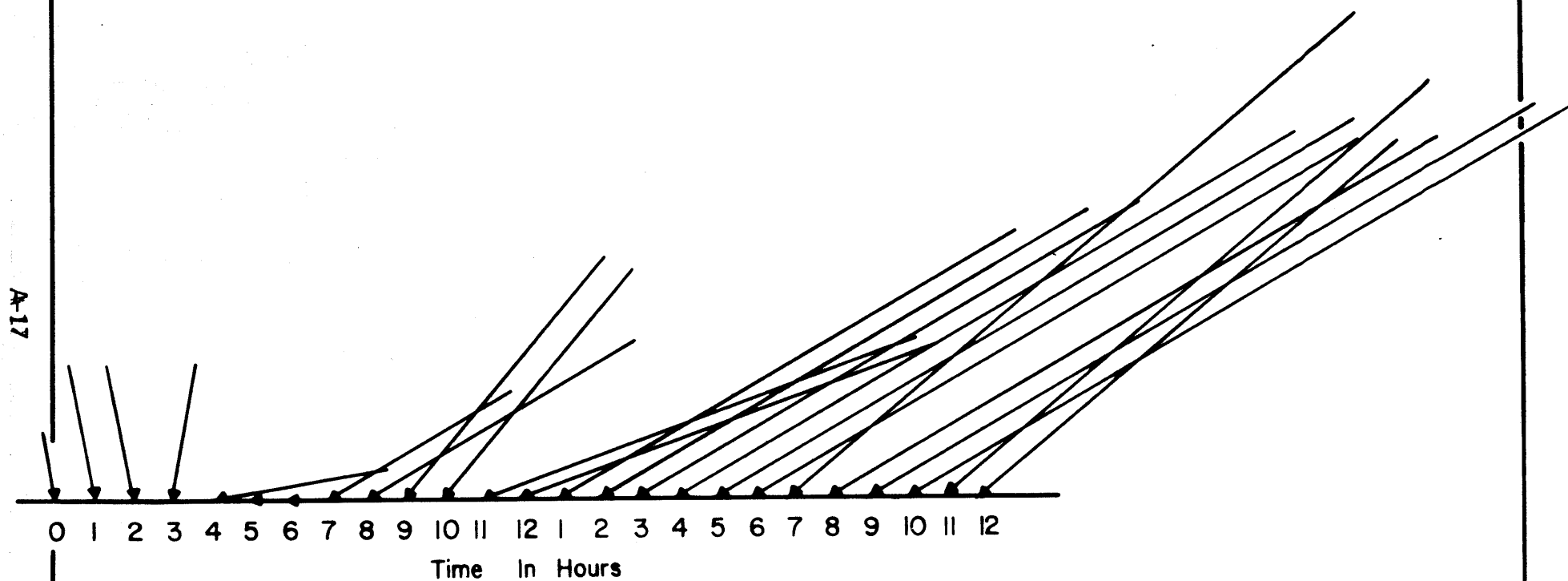


FIGURE 17

Wind Plot, Boston, Massachusetts 7 February 1978

Wind Speed Scale: 1" = 10 M. P. H.

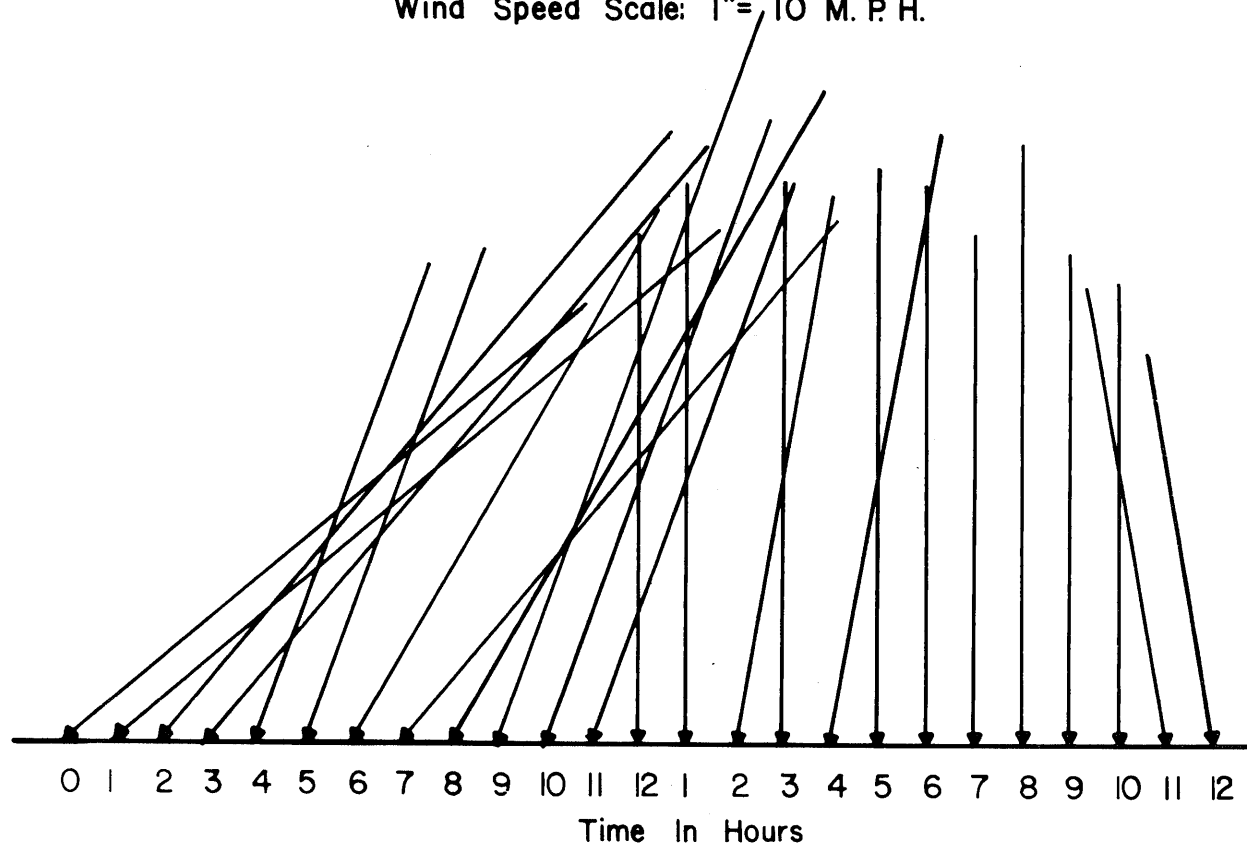


FIGURE 18

Wind Plot, Portland, Maine 6 February 1978

Wind Speed Scale: 1" = 10 M.P.H.

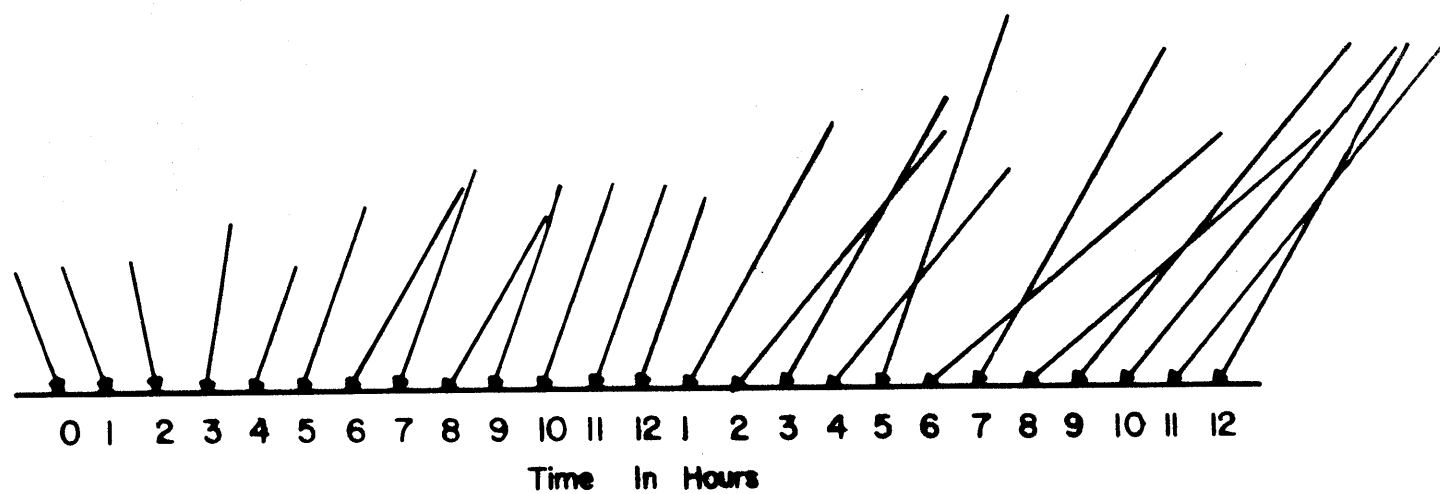


FIGURE 19

Wind Plot, Portland, Maine 7 February 1978

Wind Speed Scale: 1" = 10 M.P.H.

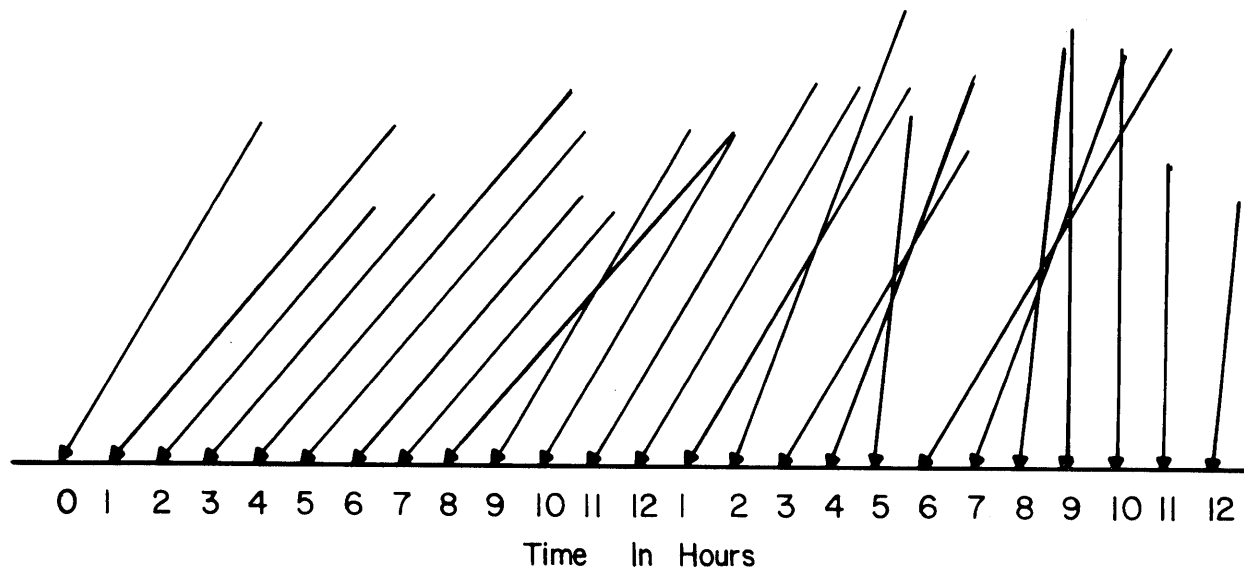


FIGURE 20



## APPENDIX B

## APPENDIX B

The tables contained herein document the cost and loss data, as it was collected during the study.

In general, the communities are listed by counties, geographically from the southernmost study limit (Provincetown, Massachusetts) to the northern limit (New Castle, New Hampshire).

As previously discussed, the data is organized and presented essentially as it was conveyed by the contributing source. Table 9 contains loss data which could be legitimately associated with individual communities. Table 10 provides State Summary Data, and Table 11, a grand total for the study area.

Terminology used in a specific set of data may be peculiar to the contributing source. A case in point is the use of the word "major" as applied to level of damage of a structure. In the context of Red Cross data (Table 1) "major" implies sufficient damage to render a building uninhabitable. In the terminology of the Federal Insurance Administration, "major" equates with their terminology "substantial improvement necessary," which they define as "greater than 50% damage." Obviously, data developed by such widely diverse definitions will be difficult to compare.

Further discussion of the tables may be found in Section V. of the report, and clarification of some of the categories in Tables 9-11 precede those tables.

TABLE 1  
NUMBER OF STRUCTURES AFFECTED BY STORM

|                          | <u>No. Houses<br/>Destroyed</u> | <u>No. Houses<br/>Damaged<br/>(Major)</u> | <u>No. Houses<br/>Damaged<br/>(Minor)</u> | <u>Small Businesses<br/>Destroyed or with<br/>Major Damage</u> |
|--------------------------|---------------------------------|---|---|--|
| <u>MASSACHUSETTS</u>     |                                 |   |   |  |
| <u>Barnstable County</u> |                                 |   |   |  |
| Provincetown             | 0                               | 0   | 50  | 0  |
| Truro                    | 0                               | 1   | 0   | 0  |
| Wellfleet                | 0                               | 0   | 0   | 0  |
| Eastham                  | 1                               | 0   | 0   | 0  |
| Orleans                  | 0                               | 0   | 1   | 0  |
| Brewster                 | 0                               | 0   | 0   | 0  |
| Dennis                   | 0                               | 0   | 0   | 0  |
| Yarmouth                 | 0                               | 0   | 0   | 0  |
| Barnstable               | 0                               | 0   | 0   | 0  |
| Sandwich                 | 0                               | 0   | 0   | 0  |
| Bourne                   | 0                               | 0   | 0   | 0  |
| <u>Plymouth County</u>   |                                 |   |   |  |
| Plymouth                 | 51                              | 31  | 123                                       | 11   |
| Kingston                 | 1                               | 1   | 9   | 0  |
| Duxbury                  | 1                               | 1   | 2   | 0  |
| Marshfield               | 8                               | 122                                       | 290                                       | 0  |
| Scituate                 | 189                             | 402                                       | 509                                       | 15   |
| Hull                     | 34                              | 103                                       | 755                                       | 8  |
| Hingham                  | 0                               | 0   | 4   | 0  |
| <u>Norfolk County</u>    |                                 |   |   |  |
| Cohasset                 | 0                               | 0   | 88  | 0  |
| Weymouth                 | 0                               | 0   | 0   | 0  |
| Braintree                | 0                               | 0   | 0   | 0  |
| Quincy                   | 2                               | 142                                       | 575                                       | 5  |
| <u>Suffolk County</u>    |                                 |   |   |  |
| Boston                   | 0                               | 0   | 0   | 0  |
| Winthrop                 | 6                               | 34  | 1000                                      | 5  |
| Revere                   | 0                               | 30  | 1209                                      | 6  |

TABLE 1 (Continued)

NUMBER OF STRUCTURES AFFECTED BY STORM

|                          | <u>No. Houses<br/>Destroyed</u> | <u>No. Houses<br/>Damaged<br/>(Major)</u> | <u>No. Houses<br/>Damaged<br/>(Minor)</u> | <u>Small Businesses<br/>Destroyed or with<br/>Major Damage</u> |
|--------------------------|---------------------------------|---|---|--|
| <u>MASSACHUSETTS</u>     |                                 |   |   |  |
| <u>Essex County</u>      |                                 |   |   |  |
| Lynn                     | 0                               | 0   | 18  | 5  |
| Nahant                   | 1                               | 39  | 68  | 9  |
| Swampscott               | 0                               | 11  | 67  | 3  |
| Marblehead               | 0                               | 38  | 68  | 9  |
| Salem                    | 2                               | 0   | 12  | 0  |
| Beverly                  | 0                               | 0   | 0   | 0  |
| Manchester               | 0                               | 0   | 50  | 0  |
| Gloucester               | 0                               | 2   | 400                                       | 0  |
| Rockport                 | 42                              | 25  | 40  | 40   |
| Essex                    | 0                               | 0   | 0   | 0  |
| Ipswich                  | 0                               | 0   | 0   | 0  |
| Rowley                   | 0                               | 0   | 10  | 0  |
| Newbury                  | 0                               | 0   | 0   | 0  |
| Newburyport              | 0                               | 20  | 80  | 0  |
| Salisbury                | 1                               | 10  | 75  | 20   |
| TOTALS                   | 339                             | 1,012                                     | 5,503                                     | 136  |
| <u>NEW HAMPSHIRE</u>     |                                 |   |   |  |
| <u>Rockingham County</u> |                                 |   |   |  |
| Seabrook                 | 0                               | 0   | 0   | 0  |
| Hampton                  | 3                               | 40  | 100                                       | 30   |
| North Hampton            | 0                               | 0   | 0   | 0  |
| Rye                      | 1                               | 15  | 30  | 12   |
| Portsmouth               | 10                              | 50  | 70  | 34   |
| New Castle               | 0                               | 0   | 0   | 0  |
| TOTALS                   | 14                              | 105                                       | 200                                       | 76   |

TABLE 2a

## FDAA FUNDING TO MUNICIPALITIES - BARNSTABLE COUNTY, MASSACHUSETTS

| <u>Community</u> | <u>Debris<br/>Clearance</u> | <u>Protective<br/>Measures</u> | <u>Road<br/>Systems</u> | <u>Water<br/>Control<br/>Facilities</u> | <u>Public<br/>Buildings</u> | <u>Public<br/>Utilities</u> | <u>Under<br/>Construction</u> | <u>Private<br/>Non-Profit</u> | <u>Other</u> | <u>Total</u> |
|------------------|-----------------------------|--------------------------------|-------------------------|---|-----------------------------|-----------------------------|-------------------------------|-------------------------------|--------------|--------------|
| Provincetown     | \$3,408.                    | \$ 8,156.                      | \$ 0.                   | \$ 0.                                   | \$ 0.                       | \$ 0.                       | \$ 0.                         | \$ 0.                         | \$ 34,906.   | \$ 46,470.   |
| Truro            | 0.                          | 0.                             | 9,080.                  | 47,716.                                 | 0.                          | 0.                          | 0.                            | 0.                            | 0.           | 56,796.      |
| Wellfleet        | 0.                          | 0.                             | 16,566.                 | 0.                                      | 0.                          | 1,548.                      | 0.                            | 0.                            | 1,657.       | 19,771.      |
| Eastham          | 972.                        | 162.                           | 0.                      | 0.                                      | 595.                        | 0.                          | 0.                            | 0.                            | 10,138.      | 11,867.      |
| Orleans          | 4,872.                      | 0.                             | 0.                      | 0.                                      | 0.                          | 0.                          | 0.                            | 0.                            | 1,802.       | 6,674.       |
| Brewster         | 5,565.                      | 0.                             | 2,661.                  | 0.                                      | 0.                          | 14,304.                     | 0.                            | 0.                            | 0.           | 22,530.      |
| Dennis           | 8,169.                      | 33,241.                        | 38,155.                 | 4,812.                                  | 0.                          | 0.                          | 0.                            | 0.                            | 5,271.       | 89,648.      |
| Yarmouth         | 0.                          | 0.                             | 0.                      | 283.                                    | 0.                          | 0.                          | 0.                            | 0.                            | 27,818.      | 28,101.      |
| Barnstable       | 344.                        | 1,747.                         | 0.                      | 19,955.                                 | 1,875.                      | 0.                          | 0.                            | 0.                            | 1,078.       | 24,999.      |
| Sandwich         | 0.                          | 0.                             | 0.                      | 0.                                      | 0.                          | 0.                          | 0.                            | 0.                            | 11,789.      | 11,789.      |
| Bourne           | 17,374.                     | 0.                             | 0.                      | 15,973.                                 | 0.                          | 0.                          | 0.                            | 0.                            | 924.         | 34,271.      |
|                  |                             |                                |                         |   |                             |                             |                               |                               |              | \$352,916.   |

TABLE 3a

## FDAA FUNDING TO STATE AGENCIES - BARNSTABLE COUNTY, MASSACHUSETTS

| <u>Community</u> | <u>Debris<br/>Clearance</u> | <u>Protective<br/>Measures</u> | <u>Road<br/>Systems</u> | <u>Water<br/>Control<br/>Facilities</u> | <u>Public<br/>Buildings</u> | <u>Public<br/>Utilities</u> | <u>Under<br/>Construction</u> | <u>Private<br/>Non-Profit</u> | <u>Other</u> | <u>Total</u> |
|------------------|-----------------------------|--------------------------------|-------------------------|---|-----------------------------|-----------------------------|-------------------------------|-------------------------------|--------------|--------------|
| Provincetown     | -                           | -                              | -                       | -                                       | -                           | -                           | -                             | -                             | -            | -            |
| Truro            | -                           | -                              | -                       | -                                       | -                           | -                           | -                             | -                             | -            | -            |
| Wellfleet        | -                           | -                              | -                       | -                                       | -                           | -                           | -                             | -                             | -            | -            |
| Eastham          | -                           | -                              | -                       | -                                       | -                           | -                           | -                             | -                             | -            | -            |
| Orleans          | -                           | -                              | -                       | -                                       | -                           | -                           | -                             | -                             | -            | -            |
| Brewster         | -                           | -                              | -                       | -                                       | -                           | -                           | -                             | -                             | -            | -            |
| Dennis           | -                           | -                              | -                       | -                                       | -                           | -                           | -                             | -                             | -            | -            |
| Yarmouth         | -                           | -                              | -                       | -                                       | -                           | -                           | -                             | -                             | -            | -            |
| Barnstable       | -                           | -                              | -                       | -                                       | -                           | -                           | -                             | -                             | -            | -            |
| Sandwich         | -                           | -                              | -                       | -                                       | -                           | -                           | -                             | -                             | -            | -            |
| Bourne           | -                           | -                              | -                       | -                                       | -                           | -                           | -                             | -                             | -            | -            |

TABLE 2b

## FDAA FUNDING TO MUNICIPALITIES - PLYMOUTH COUNTY, MASSACHUSETTS

[illegible]

**B-4**

TABLE 3b

## FDAA FUNDING TO STATE AGENCIES - PLYMOUTH COUNTY, MASSACHUSETTS

[illegible]

FDAA FUNDING TO MUNICIPALITIES - NORFOLK COUNTY, MASSACHUSETTS

[illegible]

FDAA FUNDING TO STATE AGENCIES - NORFOLK COUNTY, MASSACHUSETTS

| <u>Community</u> | <u>Debris<br/>Clearance</u> | <u>Protective<br/>Measures</u> | <u>Road<br/>Systems</u> | <u>Water<br/>Control<br/>Facilities</u> | <u>Public<br/>Buildings</u> | <u>Public<br/>Utilities</u> | <u>Under<br/>Construction</u> | <u>Private<br/>Non-Profit</u> | <u>Other</u> | <u>Total</u> |
|------------------|-----------------------------|--------------------------------|-------------------------|---|-----------------------------|-----------------------------|-------------------------------|-------------------------------|--------------|--------------|
| Cohasset         | -                           | -                              | -                       | -                                       | -                           | -                           | -                             | -                             | -            | -            |
| Weymouth         | -                           | -                              | -                       | -                                       | -                           | -                           | -                             | -                             | -            | -            |
| Braintree        | -                           | -                              | -                       | -                                       | -                           | -                           | -                             | -                             | -            | -            |
| Quincy           | -                           | -                              | -                       | -                                       | -                           | -                           | -                             | \$1,000.                      | -            | \$1,000.     |

FDAA FUNDING TO MUNICIPALITIES - SUFFOLK COUNTY, MASSACHUSETTS

8-6

FDAA FUNDING TO STATE AGENCIES - SUFFOLK COUNTY, MASSACHUSETTS

| <u>Community</u> | <u>Debris<br/>Clearance</u> | <u>Protective<br/>Measures</u> | <u>Road<br/>Systems</u> | <u>Water<br/>Control<br/>Facilities</u> | <u>Public<br/>Buildings</u> | <u>Public<br/>Utilities</u> | <u>Under<br/>Construction</u> | <u>Private<br/>Non-Profit</u> | <u>Other</u> | <u>Total</u> |
|------------------|-----------------------------|--------------------------------|-------------------------|---|-----------------------------|-----------------------------|-------------------------------|-------------------------------|--------------|--------------|
| Boston           | \$ 4,270.                   | \$ -                           | \$ 152.                 | \$ 21,221.                              | \$ 3,050.                   | \$ 1,430.                   | \$ -                          | \$6,077.                      | \$ -         | \$ 36,200.   |
| Winthrop         | -                           | -                              | -                       | -                                       | -                           | -                           | -                             | -                             | -            | -            |
| Revere           | -                           | -                              | -                       | -                                       | -                           | -                           | -                             | -                             | -            | -            |
|                  |                             |                                |                         |   |                             |                             |                               |                               |              | \$ 36,200.   |



TABLE 2e

## FDAA FUNDING TO MUNICIPALITIES - ESSEX COUNTY, MASSACHUSETTS

| <u>Community</u> | <u>Debris<br/>Clearance</u> | <u>Protective<br/>Measures</u> | <u>Road<br/>Systems</u> | <u>Water<br/>Control<br/>Facilities</u> | <u>Public<br/>Buildings</u> | <u>Public<br/>Utilities</u> | <u>Under<br/>Construction</u> | <u>Private<br/>Non-Profit</u> | <u>Other</u> | <u>Total</u> |
|------------------|-----------------------------|--------------------------------|-------------------------|---|-----------------------------|-----------------------------|-------------------------------|-------------------------------|--------------|--------------|
| Lynn             | \$ 0.                       | \$ 0.                          | \$ 480.                 | \$ 13,945.                              | \$ 0.                       | \$ 0.                       | \$ 0.                         | \$ 0.                         | \$ 1,163.    | \$ 15,588.   |
| Nahant           | 19,591.                     | 36,633.                        | 7,889.                  | 404,431.                                | 25,234.                     | 100,632.                    | 0.                            | 0.                            | 74,602.      | 669,012.     |
| Swampscott       | 7,482.                      | 8,597.                         | 11,299.                 | 147,705.                                | 300.                        | 5,391.                      | 0.                            | 0.                            | 32,828.      | 213,602.     |
| Marblehead       | 5,534.                      | 336.                           | 796.                    | 230,608.                                | 652.                        | 50,743.                     | 0.                            | 0.                            | 70,669.      | 359,338.     |
| Salem            | 13,571.                     | 2,757.                         | 3,783.                  | 11,544.                                 | 408.                        | 2,346.                      | 0.                            | 0.                            | 75,545.      | 109,954.     |
| Beverly          | 802.                        | 32,522.                        | 6,157.                  | 54,304.                                 | 8,784.                      | 5,000.                      | 0.                            | 0.                            | 36,610.      | 144,179.     |
| Manchester       | 2,264.                      | 0.                             | 59,558.                 | 237,537.                                | 24,996.                     | 0.                          | 0.                            | 0.                            | 0.           | 324,355.     |
| Gloucester       | 23,606.                     | 0.                             | 14,725.                 | 384,414.                                | 1,350.                      | 2,674.                      | 0.                            | 0.                            | 46,515.      | 473,284.     |
| Rockport         | 26,119.                     | 5,328.                         | 15,734.                 | 419,499.                                | 8,978.                      | 3,784.                      | 0.                            | 0.                            | 7,109.       | 486,551.     |
| Essex            | 0.                          | 2,679.                         | 0.                      | 2,160.                                  | 0.                          | 0.                          | 0.                            | 0.                            | 0.           | 4,839.       |
| Ipswich          | 9,984.                      | 0.                             | 1,193.                  | 0.                                      | 0.                          | 8,451.                      | 0.                            | 0.                            | 0.           | 19,628.      |
| Rowley           | 0.                          | 0.                             | 0.                      | 0.                                      | 0.                          | 0.                          | 0.                            | 0.                            | 0.           | 0.           |
| Newbury          | 15,446.                     | 772.                           | 81,477.                 | 0.                                      | 0.                          | 0.                          | 0.                            | 0.                            | 0.           | 97,695.      |
| Newburyport      | 12,410.                     | 0.                             | 0.                      | 0.                                      | 0.                          | 0.                          | 0.                            | 0.                            | 0.           | 12,410.      |
| Salisbury        | 6,730.                      | 4,020.                         | 33,388.                 | 0.                                      | 0.                          | 0.                          | 0.                            | 0.                            | 4,650.       | 48,788.      |
|                  |                             |                                |                         |   |                             |                             |                               |                               |              | \$2,979,223. |

TABLE 3e

## FDAA FUNDING TO STATE AGENCIES - ESSEX COUNTY, MASSACHUSETTS

| <u>Community</u> | <u>Debris<br/>Clearance</u> | <u>Protective<br/>Measures</u> | <u>Road<br/>Systems</u> | <u>Water<br/>Control<br/>Facilities</u> | <u>Public<br/>Buildings</u> | <u>Public<br/>Utilities</u> | <u>Under<br/>Construction</u> | <u>Private<br/>Non-Profit</u> | <u>Other</u> | <u>Total</u> |
|------------------|-----------------------------|--------------------------------|-------------------------|---|-----------------------------|-----------------------------|-------------------------------|-------------------------------|--------------|--------------|
| Lynn             | -                           | -                              | -                       | -                                       | -                           | -                           | -                             | -                             | -            | -            |
| Nahant           | \$133,225.                  | \$2,736.                       | -                       | \$491,877.                              | \$4,268.                    | \$42,391.                   | -                             | \$10,000.                     | \$282,892.   | \$967,389.   |
| Swampscott       | -                           | -                              | -                       | -                                       | -                           | -                           | -                             | 8,456.                        | -            | 8,456.       |
| Marblehead       | -                           | -                              | -                       | -                                       | -                           | -                           | -                             | -                             | -            | -            |
| Salem            | -                           | -                              | -                       | -                                       | -                           | -                           | -                             | 8,275.                        | -            | 8,275.       |
| Beverly          | -                           | -                              | -                       | -                                       | -                           | -                           | -                             | -                             | -            | -            |
| Manchester       | -                           | -                              | -                       | -                                       | -                           | -                           | -                             | -                             | -            | -            |
| Gloucester       | -                           | -                              | -                       | -                                       | -                           | -                           | -                             | -                             | -            | -            |
| Rockport         | -                           | -                              | -                       | -                                       | -                           | -                           | -                             | -                             | -            | -            |
| Essex            | -                           | -                              | -                       | -                                       | -                           | -                           | -                             | -                             | -            | -            |
| Ipswich          | 3,960.                      | -                              | -                       | -                                       | -                           | -                           | -                             | 3,540.                        | -            | 7,500.       |
| Rowley           | -                           | -                              | -                       | -                                       | -                           | -                           | -                             | -                             | -            | -            |
| Newbury          | -                           | -                              | -                       | -                                       | -                           | -                           | -                             | -                             | -            | -            |
| Newburyport      | -                           | -                              | -                       | -                                       | -                           | -                           | -                             | -                             | -            | -            |
| Salisbury        | 34,144.                     | 1,011.                         | -                       | -                                       | -                           | 738.                        | -                             | 168,847.                      | -            | 204,740.     |
|                  |                             |                                |                         |   |                             |                             |                               |                               |              | \$1,186,360. |

TABLE 2f

## FDAA FUNDING TO MUNICIPALITIES - ROCKINGHAM COUNTY, NEW HAMPSHIRE

| <u>Community</u> | <u>Debris<br/>Clearance</u> | <u>Protective<br/>Measures</u> | <u>Road<br/>Systems</u> | <u>Water<br/>Control<br/>Facilities</u> | <u>Public<br/>Buildings</u> | <u>Public<br/>Utilities</u> | <u>Under<br/>Construction</u> | <u>Private<br/>Non-Profit</u> | <u>Other</u> | <u>Total</u>      |
|------------------|-----------------------------|--------------------------------|-------------------------|---|-----------------------------|-----------------------------|-------------------------------|-------------------------------|--------------|-------------------|
| Seabrook         | \$ 0.                       | \$ 0.                          | \$ 0.                   | \$ 0.                                   | \$ 0.                       | \$ 763.                     | \$ 0.                         | \$ 319.                       | \$ 0.        | \$ 1,082.         |
| Hampton          | 2,034.                      | 49,784.                        | 6,336.                  | 0.                                      | 350.                        | 686.                        | 0.                            | 0.                            | 2,194.       | 61,384.           |
| North Hampton    | 257.                        | 1,320.                         | 0.                      | 0.                                      | 0.                          | 0.                          | 0.                            | 0.                            | 0.           | 1,577.            |
| Rye              | 7,396.                      | 2,479.                         | 6,960.                  | 0.                                      | 2,220.                      | 0.                          | 0.                            | 0.                            | 0.           | 19,055.           |
| Portsmouth       | 0.                          | 0.                             | 0.                      | 0.                                      | 0.                          | 7,219.                      | 0.                            | 0.                            | 0.           | 7,219.            |
| New Castle       | 150.                        | 4,107.                         | 773.                    | 0.                                      | 0.                          | 0.                          | 0.                            | 0.                            | 0.           | 5,030.            |
|                  |                             |                                |                         |   |                             |                             |                               |                               |              | <u>\$ 95,347.</u> |

TABLE 3f

## FDAA FUNDING TO STATE AGENCIES - ROCKINGHAM COUNTY, NEW HAMPSHIRE

| <u>Community</u> | <u>Debris<br/>Clearance</u> | <u>Protective<br/>Measures</u> | <u>Road<br/>Systems</u> | <u>Water<br/>Control<br/>Facilities</u> | <u>Public<br/>Buildings</u> | <u>Public<br/>Utilities</u> | <u>Under<br/>Construction</u> | <u>Private<br/>Non-Profit</u> | <u>Other</u> | <u>Total</u>      |
|------------------|-----------------------------|--------------------------------|-------------------------|---|-----------------------------|-----------------------------|-------------------------------|-------------------------------|--------------|-------------------|
| Seabrook         | -                           | -                              | -                       | -                                       | -                           | -                           | -                             | -                             | -            | -                 |
| Hampton          | -                           | -                              | \$ 3,151.               | -                                       | -                           | -                           | -                             | -                             | -            | \$131,540.        |
| North Hampton    | \$456.                      | -                              | 16,354.                 | -                                       | -                           | -                           | -                             | -                             | \$128,389.   | 16,810.           |
| Rye              | -                           | -                              | -                       | -                                       | -                           | -                           | -                             | -                             | -            | -                 |
| Portsmouth       | -                           | -                              | -                       | -                                       | -                           | -                           | -                             | -                             | 20,801.      | 20,801.           |
| New Castle       | -                           | -                              | 1,546.                  | -                                       | -                           | -                           | -                             | -                             | -            | 1,546.            |
|                  |                             |                                |                         |   |                             |                             |                               |                               |              | <u>\$170,697.</u> |

FDDA FUNDING TO STATE AGENCIES - MASSACHUSETTS

**B-9**

TABLE 5

CASH EXPENDITURES - AMERICAN RED CROSS

MASSACHUSETTS

| <u>Town</u>              | <u>Expenditures</u> |
|--------------------------|---------------------|
| <u>Barnstable County</u> |                     |
| Provincetown             | \$ 970              |
| Truro                    | 0                   |
| Wellfleet                | 0                   |
| Eastham                  | 0                   |
| Orleans                  | 0                   |
| Brewster                 | 0                   |
| Dennis                   | 0                   |
| Yarmouth                 | 0                   |
| Barnstable               | 0                   |
| Sandwich                 | 0                   |
| Bourne                   | 0                   |
| <u>Plymouth County</u>   |                     |
| Plymouth                 | 13,508              |
| Kingston                 | 0                   |
| Duxbury                  | 3,359               |
| Marshfield               | 12,000              |
| Scituate                 | 114,050             |
| Hull                     | 656,935             |
| Hingham                  | 0                   |
| <u>Norfolk County</u>    |                     |
| Cohasset                 | 789                 |
| Weymouth                 | 2,722               |
| Braintree                | 15,000              |
| Quincy                   | 72,705              |
| <u>Suffolk County</u>    |                     |
| Boston                   | 95,473              |
| Winthrop                 | 350,000             |
| Revere                   | 400,000             |

TABLE 5 (Continued)

CASH EXPENDITURES - AMERICAN RED CROSS

MASSACHUSETTS

| <u>Town</u>         | <u>Expenditures</u> |
|---------------------|---------------------|
| <u>Essex County</u> |                     |
| Lynn                | 2,506               |
| Nahant              | 12,000              |
| Swampscott          | 2,506               |
| Marblehead          | 2,507               |
| Salem               | 8,050               |
| Beverly             | 0                   |
| Manchester          | 0                   |
| Gloucester          | 3,599               |
| Rockport            | 3,599               |
| Essex               | 0                   |
| Ipswich             | 0                   |
| Rowley              | 0                   |
| Newbury             | 0                   |
| Newburyport         | 0                   |
| Salisbury           | 0                   |
| TOTAL               | \$ 1,772,613        |

NEW HAMPSHIRE

Rockingham County

|               |          |
|---------------|----------|
| Seabrook      | 0        |
| Hampton       | 4,487    |
| North Hampton | 0        |
| Rye           | 0        |
| Portsmouth    | 1,695    |
| New Castle    | 0        |
| TOTAL         | \$ 6,182 |

TABLE 6a

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.

TOWN OF PROVINCETOWN, BARNSTABLE COUNTY, MASSACHUSETTS

PUBLIC

1. Municipal
  - a. Man-made -
  - b. Natural -
  - c. Other  
Police-Overtime \$ 164.
2. State
  - a. Man-made -
  - b. Natural -
3. Federal
  - a. Man-made  
National Park Service-Airport Dike \$45,000.
  - b. Natural -

PRIVATE

1. Residential -
2. Commercial -
3. Other -

TABLE 6b

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.

TOWN OF TRURO, BARNSTABLE COUNTY, MASSACHUSETTS

PUBLIC

1. Municipal
  - a. Man-made -
  - b. Natural -
  - c. Other -
2. State
  - a. Man-made -
  - b. Natural -
3. Federal
  - a. Man-made
    - National Park Service-Highland House \$ 7,000.
  - b. Natural -

PRIVATE

1. Residential -
2. Commercial -
3. Other -

TABLE 6c

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.

TOWN OF WELLFLEET, BARNSTABLE COUNTY, MASSACHUSETTS

PUBLIC

|    |           |                             |           |
|----|-----------|-----------------------------|-----------|
| 1. | Municipal |                             |           |
|    | a.        | Man-made                    | -         |
|    | b.        | Natural                     |           |
|    |           | Erosion of Barrier Dunes    | \$ 3,557. |
|    |           | Channel Dredging            | \$ 7,600. |
|    | c.        | Other                       |           |
|    |           | Use of Town-owned Equipment | \$ 200.   |
| 2. | State     |                             |           |
|    | a.        | Man-made                    | -         |
|    | b.        | Natural                     | -         |
| 3. | Federal   |                             |           |
|    | a.        | Man-made                    | -         |
|    | b.        | Natural                     | -         |

PRIVATE

|    |             |                               |           |
|----|-------------|-------------------------------|-----------|
| 1. | Residential |                               |           |
| 2. | Commercial  |                               |           |
| 3. | Other       |                               |           |
|    |             | Massachusetts Audubon Society |           |
|    |             | Bridge                        | \$ 1,000. |
|    |             | Dike                          | \$ 1,000. |



TABLE 6d

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.

TOWN OF EASTHAM, BARNSTABLE COUNTY, MASSACHUSETTS

PUBLIC

- |                              |              |
|------------------------------|--------------|
| 1. Municipal                 |              |
| a. Man-made                  | -            |
| b. Natural                   | -            |
| c. Other                     | -            |
| 2. State                     |              |
| a. Man-made                  | -            |
| b. Natural                   | -            |
| 3. Federal                   |              |
| a. Man-made                  |              |
| National Park Service -      |              |
| Coast Guard Beach Damage     | \$2,015,000. |
| Indirect Coasts @ C.B. Beach | 89,000.      |
| b. Natural                   |              |

PRIVATE

- |                               |            |
|-------------------------------|------------|
| 1. Residential                | -          |
| 2. Commercial                 | -          |
| 3. Other                      |            |
| Massachusetts Audubon Society |            |
| Outermost House Destroyed     | \$ 28,000. |

TABLE 6e

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.

TOWN OF ORLEANS, BARNSTABLE COUNTY, MASSACHUSETTS

PUBLIC

|    |                      |           |
|----|----------------------|-----------|
| 1. | Municipal            |           |
| a. | Man-made             | -         |
| b. | Natural              | -         |
| c. | Other                |           |
|    | Skaket Beach Erosion | \$ 1,309. |
| 2. | State                |           |
| a. | Man-made             | -         |
| b. | Natural              | -         |
| 3. | Federal              |           |
| a. | Man-made             | -         |
| b. | Natural              | -         |

PRIVATE

|    |             |           |
|----|-------------|-----------|
| 1. | Residential | \$ 2,000. |
| 2. | Commercial  | -         |
| 3. | Other       |           |
|    | Bulkhead    | \$ 2,500. |

TABLE 6f

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.

TOWN OF BREWSTER, BARNSTABLE COUNTY, MASSACHUSETTS

PUBLIC

1. Municipal

a. Man-made

-

b. Natural

-

c. Other

-

2. State

a. Man-made

-

b. Natural

-

3. Federal

a. Man-made

-

b. Natural

-

PRIVATE

1. Residential

Estimate of Town Engineer

\$ 1,000.

2. Commercial

-

3. Other

-

TABLE 6g

COST AND LOSSES NOT REIMBURSED BY F.D.A.A.

TOWN OF DENNIS, BARNSTABLE COUNTY, MASSACHUSETTS

PUBLIC

- |    |             |   |
|----|-------------|---|
| 1. | Municipal   |   |
|    | a. Man-made | - |
|    | b. Natural  | - |
|    | c. Other    | - |
| 2. | State       |   |
|    | a. Man-made | - |
|    | b. Natural  | - |
| 3. | Federal     |   |
|    | a. Man-made | - |
|    | b. Natural  | - |

PRIVATE

- |    |  |           |
|----|--|-----------|
| 1. | Residential  |           |
|    | Estimate by Executive Secretary<br>of Board of Selectmen | \$ 3,000. |
| 2. | Commercial   | -         |
| 3. | Other  | -         |

TABLE 6h

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.TOWN OF YARMOUTH, BARNSTABLE COUNTY, MASSACHUSETTSPUBLIC

## 1. Municipal

## a. Man-made

Boardwalk repair

\$20,185.

## b. Natural

Dredging Bass River

\$18,000.

## c. Other

-

## 2. State

## a. Man-made

-

## b. Natural

-

## 3. Federal

## a. Man-made

-

## b. Natural

-

PRIVATE

## 1. Residential

-

## 2. Commercial

-

## 3. Other

-

TABLE 6i

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.

TOWN OF BARNSTABLE, BARNSTABLE COUNTY, MASSACHUSETTS

PUBLIC

|    |                            |  |            |
|----|----------------------------|--|------------|
| 1. | Municipal                  |  |            |
| a. | Man-made                   |  | -          |
| b. | Natural                    |  |            |
|    | Sand Dune Erosion          |  | \$ 6,758.  |
|    | Dredging                   |  | \$ 20,870. |
| c. | Other                      |  |            |
|    | Fire Department - Overtime |  | \$ 103.    |
| 2. | State                      |  |            |
| a. | Man-made                   |  | -          |
| b. | Natural                    |  | -          |
| 3. | Federal                    |  |            |
| a. | Man-made                   |  | -          |
| b. | Natural                    |  | -          |

PRIVATE

|    |             |   |
|----|-------------|---|
| 1. | Residential | - |
| 2. | Commercial  | - |
| 3. | Other       | - |

TABLE 6j

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.

TOWN OF SANDWICH, BARNSTABLE COUNTY, MASSACHUSETTS

PUBLIC

1. Municipal

- |             |   |
|-------------|---|
| a. Man-made | - |
| b. Natural  | - |
| c. Other    | - |

2. State

- |             |   |
|-------------|---|
| a. Man-made | - |
| b. Natural  | - |

3. Federal

- |             |   |
|-------------|---|
| a. Man-made | - |
| b. Natural  | - |

PRIVATE

- |                |         |
|----------------|---------|
| 1. Residential | -       |
| 2. Commercial  | -       |
| 3. Other       |         |
| Flagpole       | \$ 850. |

TABLE 6k

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.

TOWN OF BOURNE, BARNSTABLE COUNTY, MASSACHUSETTS

PUBLIC

|    |             |   |
|----|-------------|---|
| 1. | Municipal   |   |
|    | a. Man-made | - |
|    | b. Natural  | - |
|    | c. Other    | - |
| 2. | State       |   |
|    | a. Man-made | - |
|    | b. Natural  | - |
| 3. | Federal     |   |
|    | a. Man-made | - |
|    | b. Natural  | - |

PRIVATE

|    |              |           |
|----|--------------|-----------|
| 1. | Residential  | -         |
| 2. | Commercial   | -         |
| 3. | Other        |           |
|    | Private Road | \$ 8,463. |



TABLE 61

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.

TOWN OF PLYMOUTH, PLYMOUTH COUNTY, MASSACHUSETTS

PUBLIC

1. Municipal

a. Man-made

|  |             |
|--|-------------|
| Debris Clearance - Morton Park and<br>Ellisville Harbor                | \$ 27,693.  |
| Fire Truck   | \$ 334.     |
| Water Control Facilities - Groins,<br>Beaches, Revetments and Channels | \$ 472,687. |
| Other - Beaches, Landings, Seawall,<br>Comfort Stations and Bath House | \$ 49,493.  |

b. Natural

|                  |              |
|------------------|--------------|
| Erosion          | \$3,000,000. |
| Channel Dredging | \$ 750,000.  |
| Bird Sanctuary   | \$ 28,841.   |

c. Other

|                        |           |
|------------------------|-----------|
| Extra Engineering Work | \$ 2,294. |
|------------------------|-----------|

2. State

a. Man-made

-

b. Natural

-

3. Federal

a. Man-made

-

b. Natural

-

TABLE 61 (Continued)

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.

TOWN OF PLYMOUTH, PLYMOUTH COUNTY, MASSACHUSETTS

PRIVATE

|    |                      |              |
|----|----------------------|--------------|
| 1. | Residential          | \$3,130,000. |
| 2. | Commercial           |              |
|    | 11 Structures        | \$ 786,500.  |
|    | Lobster Pound Damage | \$ 10,000.   |
|    | 1 Vessel Destroyed   | \$ 65,000.   |
|    | 101 Gill Nets Lost   | \$ 35,000.   |
|    | 53 Gill Nets Damaged | \$ 7,000.    |
|    | Revenue Lost         | \$ 243,200.  |
| 3. | Other                |              |
|    | Stairs to Beaches    | \$ 225,000.  |
|    | Utilities            | \$ 200,000.  |

TABLE 6m

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.

TOWN OF KINGSTON, PLYMOUTH COUNTY, MASSACHUSETTS

PUBLIC

1. Municipal

a. Man-made

|                          |    |         |
|--------------------------|----|---------|
| Boundary Ave.            | \$ | 31,807. |
| Town Floats              | \$ | 199.    |
| Harbor Master's Building | \$ | 864.    |
| Other                    | \$ | 10,706. |

b. Natural

|                                |    |          |
|--------------------------------|----|----------|
| Dredging Channel, Kingston Bay | \$ | 800,210. |
| Erosion, Gray's Beach          | \$ | 1,075.   |

c. Other

|                 |    |      |
|-----------------|----|------|
| Police-Overtime | \$ | 280. |
|-----------------|----|------|

2. State

a. Man-made

-

b. Natural

-

3. Federal

a. Man-made

-

b. Natural

-

PRIVATE

1. Residential

-

2. Commercial

-

3. Other

-

TABLE 6n  
COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.  
TOWN OF DUXBURY, PLYMOUTH COUNTY, MASSACHUSETTS

PUBLIC

|    |           |                             |             |
|----|-----------|-----------------------------|-------------|
| 1. | Municipal |                             |             |
|    | a.        | Man-made                    | -           |
|    | b.        | Natural                     |             |
|    |           | Duxbury Beach Sand Dunes    | \$ 103,427. |
|    | c.        | Other                       |             |
|    |           | Evacuation of Coastal Areas | \$ 948.     |
| 2. | State     |                             |             |
|    | a.        | Man-made                    | -           |
|    | b.        | Natural                     | -           |
| 3. | Federal   |                             |             |
|    | a.        | Man-made                    |             |
|    |           | Coast Guard - Utilities     | \$ 5,000.   |
|    | b.        | Natural                     | -           |

PRIVATE

|    |             |                     |            |
|----|-------------|---------------------|------------|
| 1. | Residential |                     |            |
|    |             | Homes               | \$ 26,000. |
| 2. | Commercial  |                     |            |
|    |             | Business            | \$ 1,500.  |
|    |             | Lobster Gear Damage | 1,500.     |
| 3. | Other       |                     | -          |

TABLE 6o

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.

TOWN OF MARSHFIELD, PLYMOUTH COUNTY, MASSACHUSETTS

PUBLIC

|    |                           |    |          |
|----|---------------------------|----|----------|
| 1. | Municipal                 |    |          |
| a. | Man-made                  |    |          |
|    | Sand Clogged Drains       | \$ | 2,200.   |
|    | Seawalls, Jetties, Riprap | \$ | 192,272. |
|    | Parking Lot               | \$ | 6,150.   |
| b. | Natural                   |    |          |
|    | Dunes                     | \$ | 1,850.   |
| c. | Other                     |    |          |
|    | Evacuation                | \$ | 26,088.  |
|    | Feeding and Housing       | \$ | 6,108.   |
| 2. | State                     |    |          |
| a. | Man-made                  | -  |          |
| b. | Natural                   | -  |          |
| 3. | Federal                   |    |          |
| a. | Man-made                  | -  |          |
| b. | Natural                   | -  |          |

PRIVATE

|    |                                  |               |
|----|----------------------------------|---------------|
| 1. | Residential                      | \$40,000,000. |
| 2. | Commercial                       |               |
|    | 1 Damaged Boat                   | \$ 2,000.     |
|    | 65 Gill Nets Lost or Damaged     | \$ 25,000.    |
|    | 500 Lobster Pots Lost or Damaged | \$ 12,000.    |
| 3. | Other                            | -             |

TABLE 6p

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.

TOWN OF SCITUATE, PLYMOUTH COUNTY, MASSACHUSETTS

PUBLIC

1. Municipal

a. Man-made

|   |              |
|---|--------------|
| Debris Clearance - roads, drainage<br>ditches         | \$ 101,046.  |
| Protective Measures - ponds                           | \$ 126,498.  |
| vehicles  | \$ 5,339.    |
| Seawalls, revetments, beach<br>access ramps, channels | \$1,745,571. |
| Water Control Facilities at<br>Musquasicut Pond       | \$ 6,547.    |

b. Natural

-

c. Other

|  |            |
|--|------------|
| Personnel Overtime - relief<br>assistance, engineering public<br>grounds | \$ 12,947. |
|--|------------|

2. State

a. Man-made

-

b. Natural

-

3. Federal

a. Man-made

|                                    |            |
|------------------------------------|------------|
| U.S. Coast Guard<br>Vessel         | \$ 40,000. |
| Bldg., equipment & road<br>systems | \$ 2,000.  |
| Pier and boat floats               | \$ 14,000. |

b. Natural

-

TABLE 6p (Continued)

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.

TOWN OF SCITUATE, PLYMOUTH COUNTY, MASSACHUSETTS

PRIVATE

|    |                                |              |
|----|--------------------------------|--------------|
| 1. | Residential                    | \$5,267,046. |
| 2. | Commercial                     | \$ 140,487.  |
|    | 18 Destroyed or Damaged Boats  | \$ 130,000.  |
|    | 173 Gill Nets Lost or Damaged  | \$ 60,000.   |
|    | 3 Lobster Cars Lost or Damaged | \$ 3,000.    |
|    | 1000 Pots Lost or Damaged      | \$ 25,000.   |
| 3. | Other                          |              |
|    | Brockton Edison Co.            | \$ 177,000.  |
|    | New Bedford Gas & Electric Co. | \$ 100,000.  |
|    | Bay State Gas Co.              | \$ 91,000.   |

TABLE 6g

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.

TOWN OF HULL, PLYMOUTH COUNTY, MASSACHUSETTS

PUBLIC

1. Municipal

|    |                               |    |            |
|----|-------------------------------|----|------------|
| a. | Man-made                      |    |            |
|    | Water Control Facilities -    |    |            |
|    | seawalls, channels            | \$ | 1,083,569. |
|    | Playground                    | \$ | 1,760.     |
| b. | Natural                       |    |            |
|    | Bluff Restoration             | \$ | 150,000.   |
| c. | Other                         |    |            |
|    | Extra Police & Fire Personnel | \$ | 63,176.    |
|    | Additional Town Office and    |    |            |
|    | Overhead Expenses             | \$ | 1,040.     |
|    | Evacuation                    | \$ | 1,425.     |
|    | Damaged Vehicles              | \$ | 159,868.   |
|    | Flooding                      | \$ | 2,244.     |

2. State

|    |                               |    |          |
|----|-------------------------------|----|----------|
| a. | Man-made                      |    |          |
|    | Nantasket Beach - bath house, |    |          |
|    | confort station, seawall and  |    |          |
|    | parking lot                   | \$ | 109,536. |
| b. | Natural                       |    |          |
|    | Nantasket Beach - erosion     | \$ | 300,000. |

3. Federal

|    |                              |    |          |
|----|------------------------------|----|----------|
| a. | Man-made                     |    |          |
|    | Coast Guard - pier, walkway, |    |          |
|    | building and equipment       | \$ | 220,000. |
| b. | Natural                      |    | -        |



TABLE 6q (Continued)

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.

TOWN OF HULL, PLYMOUTH COUNTY, MASSACHUSETTS

PRIVATE

|    |                        |               |
|----|------------------------|---------------|
| 1. | Residential            | \$10,000,000. |
| 2. | Commercial             | \$ 1,973,000. |
|    | Loss of Gill Nets (60) | \$ 21,000.    |
|    | Damaged Vessel         | \$ 6,000.     |
| 3. | Other                  |               |
|    | Red Cross              | -             |

TABLE 6r

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.

TOWN OF HINGHAM, PLYMOUTH COUNTY, MASSACHUSETTS

PUBLIC

1. Municipal

|    |                                  |            |
|----|----------------------------------|------------|
| a. | Man-made                         |            |
|    | Piers                            | \$ 5,805.  |
|    | Water Control Facilities         | \$ 3,800.  |
|    | Hingham Beach                    | \$ 8,800.  |
|    | Other                            | \$ 52,346. |
| b. | Natural                          |            |
|    | Hingham Beach                    | \$ 575.    |
| c. | Other                            |            |
|    | Overtime - Police, Fire, Highway | \$ 13,206. |

2. State

|    |          |   |
|----|----------|---|
| a. | Man-made | - |
| b. | Natural  | - |

3. Federal

|    |          |   |
|----|----------|---|
| a. | Man-made | - |
| b. | Natural  | - |

PRIVATE

|    |             |            |
|----|-------------|------------|
| 1. | Residential | \$100,000. |
| 2. | Commercial  | -          |
| 3. | Other       | -          |

TABLE 6s

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.

TOWN OF COHASSET, NORFOLK COUNTY, MASSACHUSETTS

PUBLIC

|    |           |                         |
|----|-----------|-------------------------|
| 1. | Municipal |                         |
|    | a.        | Man-made                |
|    |           | Road Systems \$577,713. |
|    |           | Fire Station \$ 11,532. |
|    | b.        | Natural                 |
|    |           | Sandy Beach \$ 55,120.  |
|    | c.        | Other -                 |
| 2. | State     |                         |
|    | a.        | Man-made -              |
|    | b.        | Natural -               |
| 3. | Federal   |                         |
|    | a.        | Man-made -              |
|    | b.        | Natural -               |

PRIVATE

|    |                                    |            |
|----|------------------------------------|------------|
| 1. | Residential                        | -          |
| 2. | Commercial                         |            |
|    | 13 Damaged Vessels                 | \$ 50,000. |
|    | 3,600 Lobster Pots Lost or Damaged | \$ 75,000. |
|    | 118 Gill Nets                      | \$ 37,000. |
|    | Damaged or Lost Lobster Cans       | \$ 7,000   |
|    | Private Pier Destroyed             | \$ 60,000. |
| 3. | Other                              | -          |

TABLE 6t

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.

TOWN OF WEYMOUTH, NORFOLK COUNTY, MASSACHUSETTS

PUBLIC

1. Municipal

a. Man-made

-

b. Natural

Beach Erosion

\$32,662.

c. Other

Wages for Fire & Police

\$53,341.

2. State

a. Man-made

-

b. Natural

-

3. Federal

a. Man-made

-

b. Natural

-

PRIVATE

1. Residential

2. Commercial

3. Other

TABLE 6u

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.

TOWN OF BRAINTREE, NORFOLK COUNTY, MASSACHUSETTS

PUBLIC

1. Municipal
  - a. Man-made  
Smith Beach & Sunset Lake Rec. Areas \$18,678.
  - b. Natural -
  - c. Other -
2. State
  - a. Man-made -
  - b. Natural -
3. Federal
  - a. Man-made -
  - b. Natural -

PRIVATE

1. Residential -
2. Commercial -
3. Other -

TABLE 6v

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.

CITY OF QUINCY, NORFOLK COUNTY, MASSACHUSETTS

PUBLIC

|    |                                    |            |
|----|------------------------------------|------------|
| 1. | Municipal                          |            |
| a. | Man-made                           |            |
|    | Protective Measures                | \$401,732. |
|    | Athletic Field                     | \$ 10,229. |
|    | Parks                              | \$ 6,912.  |
| b. | Natural                            | -          |
| c. | Other                              |            |
|    | Civil Defense Emergency Operations | \$126,407. |
| 2. | State                              |            |
| a. | Man-made                           | -          |
| b. | Natural                            | -          |
| 3. | Federal                            |            |
| a. | Man-made                           | -          |
| b. | Natural                            | -          |

PRIVATE

|    |             |            |
|----|-------------|------------|
| 1. | Residential | \$945,250. |
| 2. | Commercial  | \$675,000. |
| 3. | Other       | -          |

TABLE 6w

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.

CITY OF BOSTON, SUFFOLK COUNTY, MASSACHUSETTS

PUBLIC

1. Municipal
  - a. Man-made
    - Fill Behind Breached Seawalls \$1,000,000.
    - and Slope Erosion
    - Facilities under Construction \$ 23,664.
  - b. Natural -
  - c. Other
    - Protective Measures \$2,256,277.
2. State
  - a. Man-made -
  - b. Natural
    - M.D.C. - Beach Erosion \$ 60,000.
3. Federal
  - a. Man-made
    - U.S. Coast Guard - Piers and Walkways \$ 50,000.
  - b. Natural -

TABLE 6w (Continued)

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.

CITY OF BOSTON, SUFFOLK COUNTY, MASSACHUSETTS

PRIVATE

|    |                        |                |
|----|------------------------|----------------|
| 1. | Residential            | -              |
| 2. | Commercial             |                |
|    | 9-10 Destroyed Vessels | \$1,000,000. + |
|    | 500 Lobster Pots       | \$ 25,000.     |
|    | 2 Gill Nets            | \$ 8,000.      |
|    | Vessel Damage          | \$ 50,000.     |
| 3. | Other                  | -              |



TABLE 6x

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.

TOWN OF WINTHROP, SUFFOLK COUNTY, MASSACHUSETTS

PUBLIC

|    |                                    |            |
|----|------------------------------------|------------|
| 1. | Municipal                          |            |
| a. | Man-made<br>Seawall reconstruction | \$ 48,000. |
| b. | Natural<br>Erosion                 | \$ 60,000. |
| c. | Other                              | -          |
| 2. | State                              |            |
| a. | Man-made                           | -          |
| b. | Natural                            | -          |
| 3. | Federal                            |            |
| a. | Man-made                           | -          |
| b. | Natural                            | -          |

PRIVATE

|    |             |              |
|----|-------------|--------------|
| 1. | Residential | \$1,500,000. |
| 2. | Commercial  | \$ 500,000.  |
| 3. | Other       | -            |

TABLE 6y

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.

CITY OF REVERE, SUFFOLK COUNTY, MASSACHUSETTS

PUBLIC

|    |           |          |            |
|----|-----------|----------|------------|
| 1. | Municipal |          |            |
|    | a.        | Man-made | -          |
|    | b.        | Natural  | -          |
|    | c.        | Other    | -          |
| 2. | State     |          |            |
|    | a.        | Man-made | -          |
|    | b.        | Natural  |            |
|    |           | Erosion  | \$ 60,000. |
| 3. | Federal   |          |            |
|    | a.        | Man-made | -          |
|    | b.        | Natural  | -          |

PRIVATE

|    |               |               |
|----|---------------|---------------|
| 1. | Residential   | \$ 2,000,000. |
| 2. | Commercial    | \$13,151,450. |
|    | Gill Net Loss | \$ 1,000.     |
| 3. | Other         | -             |

TABLE 6z

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.

CITY OF LYNN, ESSEX COUNTY, MASSACHUSETTS

PUBLIC

1. Municipal

a. Man-made

b. Natural

c. Other

2. State

a. Man-made

b. Natural

3. Federal

a. Man-made

b. Natural

PRIVATE

1. Residential

2. Commercial

3. Other

\$ 200,000.

\$10,000,000.

TABLE 6z

TABLE 6aa

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.

TOWN OF NAHANT, ESSEX COUNTY, MASSACHUSETTS

PUBLIC

1. Municipal

a. Man-made

|             |    |         |
|-------------|----|---------|
| Utilities   | \$ | 16,639. |
| Parks       | \$ | 1,017.  |
| Fire Trucks | \$ | 90,000. |

b. Natural

-

c. Other

|                         |    |         |
|-------------------------|----|---------|
| Emergency Work and Food | \$ | 14,597. |
|-------------------------|----|---------|

2. State

a. Man-made

-

b. Natural

|            |    |         |
|------------|----|---------|
| Sand Dunes | \$ | 70,000. |
|------------|----|---------|

3. Federal

a. Man-made

|                      |    |        |
|----------------------|----|--------|
| U.S. Coast Guard -   |    |        |
| Buildings, Equipment | \$ | 5,000. |
| Boat and Trailer     | \$ | 5,000. |

b. Natural

-

PRIVATE

|                |              |
|----------------|--------------|
| 1. Residential | \$1,000,000. |
|----------------|--------------|

|                     |            |
|---------------------|------------|
| 2. Commercial       | \$ 40,000. |
| 2 Destroyed Vessels | \$ 30,000. |
| Fish Gear           | \$ 7,000.  |

|          |   |
|----------|---|
| 3. Other | - |
|----------|---|

TABLE 6bb

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.

TOWN OF SWAMPSCOTT, ESSEX COUNTY, MASSACHUSETTS

PUBLIC

|    |           |                  |           |
|----|-----------|------------------|-----------|
| 1. | Municipal |                  |           |
|    | a.        | Man-made         |           |
|    |           | Seawalls         | \$ 9,746. |
|    |           | Utilities        | \$40,025. |
|    |           | Recreation Areas | \$ 2,064. |
|    | b.        | Natural          | -         |
|    | c.        | Other            | -         |
| 2. | State     |                  |           |
|    | a.        | Man-made         | -         |
|    | b.        | Natural          | -         |
| 3. | Federal   |                  |           |
|    | a.        | Man-made         | -         |
|    | b.        | Natural          | -         |

PRIVATE

|    |                    |           |
|----|--------------------|-----------|
| 1. | Residential        | \$ 8,597. |
| 2. | Commercial         |           |
|    | 1 Destroyed Vessel | \$38,000. |
|    | Fish Gear          | \$11,000. |
| 3. | Other              | -         |

TABLE 6cc

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.

TOWN OF MARBLEHEAD, ESSEX COUNTY, MASSACHUSETTS

PUBLIC

|    |           |           |           |
|----|-----------|-----------|-----------|
| 1. | Municipal |           |           |
|    | a.        | Man-made  |           |
|    |           | Buildings | \$23,074. |
|    |           | Utilities | \$23,939. |
|    | b.        | Natural   | -         |
|    | c.        | Other     | -         |
| 2. | State     |           |           |
|    | a.        | Man-made  | -         |
|    | b.        | Natural   | -         |
| 3. | Federal   |           |           |
|    | a.        | Man-made  | -         |
|    | b.        | Natural   | -         |

PRIVATE

|    |                    |           |
|----|--------------------|-----------|
| 1. | Residential        | -         |
| 2. | Commercial         |           |
|    | 1 Destroyed Vessel | \$12,000. |
|    | 1 Damaged Vessel   | \$ 5,000. |
| 3. | Other              | -         |

TABLE 6dd

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.

CITY OF SALEM, ESSEX COUNTY, MASSACHUSETTS

PUBLIC

1. Municipal

- a. Man-made  
Parks and Playgrounds \$31,304.
- b. Natural -
- c. Other  
Overtime - Police and Fire Dept. \$ 136.

2. State

- a. Man-made -
- b. Natural -

3. Federal

- a. Man-made -
- b. Natural -

PRIVATE

- 1. Residential -
- 2. Commercial \$41,984.  
1 Destroyed Vessel \$25,000.
- 3. Other \$ 8,411.

TABLE 6ee

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.

CITY OF BEVERLY, ESSEX COUNTY, MASSACHUSETTS

PUBLIC

1. Municipal

- a. Man-made Protective Measures \$ 9,786.
- b. Natural -
- c. Other \$ 798.

2. State

- a. Man-made -
- b. Natural -

3. Federal

- a. Man-made -
- b. Natural -

PRIVATE

- 1. Residential -
- 2. Commercial
  - Marina \$35,000.
  - Fishing Equipment \$ 5,000.
- 3. Other -



TABLE 6ff

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.

TOWN OF MANCHESTER, ESSEX COUNTY, MASSACHUSETTS

PUBLIC

1. Municipal

|    |               |    |         |
|----|---------------|----|---------|
| a. | Man-made      |    |         |
|    | Roadways      | \$ | 1,068.  |
| b. | Natural       |    |         |
|    | Singing Beach | \$ | 11,838. |
|    | Black Beach   | \$ | 452.    |
| c. | Other         |    | -       |

2. State

- |    |          |  |   |
|----|----------|--|---|
| a. | Man-made |  | - |
| b. | Natural  |  | - |

3. Federal

- |    |          |  |   |
|----|----------|--|---|
| a. | Man-made |  | - |
| b. | Natural  |  | - |

PRIVATE

|    |             |              |
|----|-------------|--------------|
| 1. | Residential | \$1,557,000. |
| 2. | Commercial  | \$ 417,000.  |
| 3. | Other       | -            |

TABLE 6gg

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.

CITY OF GLOUCESTER, ESSEX COUNTY, MASSACHUSETTS

PUBLIC

|    |                               |    |          |
|----|-------------------------------|----|----------|
| 1. | Municipal                     |    |          |
| a. | Man-made                      |    |          |
|    | Seawalls                      | \$ | 117,953. |
|    | Magnolia Point Pier           | \$ | 1,877.   |
|    | Playgrounds and Parks         | \$ | 9,553.   |
|    | Roadways                      | \$ | 1,710.   |
| b. | Natural                       |    |          |
|    | Good Harbor and Grey Beaches  | \$ | 225,283. |
| c. | Other                         |    | -        |
| 2. | State                         |    |          |
| a. | Man-made                      |    | -        |
| b. | Natural                       |    | -        |
| 3. | Federal                       |    |          |
| a. | Man-made                      |    |          |
|    | U.S. Coast Guard -            |    |          |
|    | Bldgs., Equipment & Utilities | \$ | 15,000.  |
|    | 1 Destroyed Vessel            | \$ | 10,000.  |
| b. | Natural                       |    | -        |

PRIVATE

|    |                     |               |
|----|---------------------|---------------|
| 1. | Residential         | \$13,500,000. |
| 2. | Commercial          | \$ 5,652,365. |
|    | 6 Destroyed Vessels | \$ 100,000.   |
|    | Damaged Vessels     | \$ 10,000.    |
|    | Fishing Gear        | \$ 10,000.    |
|    | Buildings           | \$ 35,000.    |
|    | Indirect Expenses   | \$17,888,474. |
| 3. | Other               | \$ 19,000.    |

TABLE 6hh

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.

TOWN OF ROCKPORT, ESSEX COUNTY, MASSACHUSETTS

PUBLIC

|    |                         |            |
|----|-------------------------|------------|
| 1. | Municipal               |            |
| a. | Man-made                |            |
|    | Seawalls and Breakwater | \$509,512. |
| b. | Natural                 | -          |
| c. | Other                   | -          |
| 2. | State                   |            |
| a. | Man-made                | -          |
| b. | Natural                 | -          |
| 3. | Federal                 |            |
| a. | Man-made                | -          |
| b. | Natural                 | -          |

PRIVATE

|    |                               |            |
|----|-------------------------------|------------|
| 1. | Residential                   | \$311,850. |
| 2. | Commercial                    |            |
|    | Building                      | \$202,000. |
|    | 6 Destroyed Vessels           | \$120,000. |
|    | 25 Destroyed Small Boats      | \$ 15,000. |
|    | 20 Damaged Vessels            | \$ 80,000. |
|    | Dealership Facility Destroyed | \$300,000. |
|    | Fishing Gear                  | \$ 88,000. |
|    | Building                      | \$ 10,000. |
| 3. | Other                         | \$ 10,000. |

TABLE 6ii

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.

TOWN OF ESSEX, ESSEX COUNTY, MASSACHUSETTS

PUBLIC

|    |                                 |    |      |
|----|---------------------------------|----|------|
| 1. | Municipal                       |    |      |
| a. | Man-made<br>Protective Measures | \$ | 156. |
| b. | Natural                         | -  |      |
| c. | Other                           | -  |      |
| 2. | State                           |    |      |
| a. | Man-made                        | -  |      |
| b. | Natural                         | -  |      |
| 3. | Federal                         |    |      |
| a. | Man-made                        | -  |      |
| b. | Natural                         | -  |      |

PRIVATE

|    |             |            |
|----|-------------|------------|
| 1. | Residential | \$236,968. |
| 2. | Commercial  | \$121,468. |
| 3. | Other       | -          |

TABLE 6jj

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.

TOWN OF IPSWICH, ESSEX COUNTY, MASSACHUSETTS

PUBLIC

|    |                    |            |
|----|--------------------|------------|
| 1. | Municipal          |            |
|    | a. Man-made        | -          |
|    | b. Natural         | -          |
|    | c. Other           |            |
|    | Wages for Clean-up | \$ 10,000. |
| 2. | State              |            |
|    | a. Man-made        | -          |
|    | b. Natural         | -          |
| 3. | Federal            |            |
|    | a. Man-made        | -          |
|    | b. Natural         | -          |

PRIVATE

|    |             |            |
|----|-------------|------------|
| 1. | Residential | \$179,000. |
| 2. | Commercial  | \$ 35,000. |
| 3. | Other       | \$ 4,290.  |

TABLE 6kk

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.

TOWN OF ROWLEY, ESSEX COUNTY, MASSACHUSETTS

PUBLIC

|    |             |         |
|----|-------------|---------|
| 1. | Municipal   |         |
|    | a. Man-made | \$ 583. |
|    | b. Natural  | -       |
|    | c. Other    | -       |
| 2. | State       |         |
|    | a. Man-made | -       |
|    | b. Natural  | -       |
| 3. | Federal     |         |
|    | a. Man-made | -       |
|    | b. Natural  | -       |

PRIVATE

|    |             |          |
|----|-------------|----------|
| 1. | Residential | -        |
| 2. | Commercial  | \$2,000. |
| 3. | Other       | -        |

TABLE 611

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.

TOWN OF NEWBURY, ESSEX COUNTY, MASSACHUSETTS

PUBLIC

1. Municipal

|    |                     |           |
|----|---------------------|-----------|
| a. | Man-made            |           |
|    | Protective Measures | \$ 6,072. |
|    | Road Systems        | \$ 426.   |

|    |         |   |
|----|---------|---|
| b. | Natural | - |
|----|---------|---|

|    |       |   |
|----|-------|---|
| c. | Other | - |
|----|-------|---|

2. State

|    |          |   |
|----|----------|---|
| a. | Man-made | - |
|----|----------|---|

|    |         |   |
|----|---------|---|
| b. | Natural | - |
|----|---------|---|

3. Federal

|    |          |   |
|----|----------|---|
| a. | Man-made | - |
|----|----------|---|

|    |         |   |
|----|---------|---|
| b. | Natural | - |
|----|---------|---|

PRIVATE

|    |             |           |
|----|-------------|-----------|
| 1. | Residential | -         |
| 2. | Commercial  | \$10,000. |
| 3. | Other       | -         |

TABLE 6mm

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.

CITY OF NEWBURYPORT, ESSEX COUNTY, MASSACHUSETTS

PUBLIC

1. Municipal

|                           |           |
|---------------------------|-----------|
| a. Man-made               |           |
| Buildings and Utilities   | \$21,601. |
| CDBG Funds for Fire Truck | \$67,500. |

|            |   |
|------------|---|
| b. Natural | - |
|------------|---|

|          |   |
|----------|---|
| c. Other | - |
|----------|---|

2. State

|             |   |
|-------------|---|
| a. Man-made | - |
|-------------|---|

|            |   |
|------------|---|
| b. Natural | - |
|------------|---|

3. Federal

|                                     |           |
|-------------------------------------|-----------|
| a. Man-made                         |           |
| U.S. Coast Guard - Bldgs. and Eqmt. | \$12,000. |

|            |   |
|------------|---|
| b. Natural | - |
|------------|---|

PRIVATE

|                |   |
|----------------|---|
| 1. Residential | - |
|----------------|---|

|                        |           |
|------------------------|-----------|
| 2. Commercial          |           |
| 1 Destroyed Vessel     | \$10,000. |
| Damaged Vessels        | \$25,000. |
| Dealer Facility Damage | \$ 5,000. |
| Boat Yard              | \$30,000. |

|          |   |
|----------|---|
| 3. Other | - |
|----------|---|



TABLE 6nn

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.  
TOWN OF SALISBURY, ESSEX COUNTY, MASSACHUSETTS

PUBLIC

1. Municipal

|    |                  |    |        |
|----|------------------|----|--------|
| a. | Man-made         |    |        |
|    | Town Pier        | \$ | 3,000. |
|    | Debris Clearance | \$ | 1,696. |
|    | Road Systems     | \$ | 3,690. |
| b. | Natural          |    | -      |
| c. | Other            |    | -      |

2. State

|    |  |              |         |
|----|--|--------------|---------|
| a. | Man-made   |              |         |
|    | Dept. of Environmental Management -<br>Salisbury State Beach     | \$           | 55,000. |
| b. | Natural  |              |         |
|    | Dept. of Environmental Management -<br>Sand Dunes at State Beach | \$1,276,100. |         |

3. Federal

|    |          |   |
|----|----------|---|
| a. | Man-made | - |
| b. | Natural  | - |

PRIVATE

|    |                           |              |          |
|----|---------------------------|--------------|----------|
| 1. | Residential               | \$           | 280,000. |
| 2. | Commercial                | \$1,570,000. |          |
|    | 1 Destroyed Vessel        | \$           | 3,000.   |
|    | Dealer Facility Destroyed | \$           | 20,000.  |
| 3. | Other                     | -            |          |

TABLE 600

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.

TOWN OF SEABROOK, ROCKINGHAM COUNTY, NEW HAMPSHIRE

PUBLIC

|    |             |          |
|----|-------------|----------|
| 1. | Municipal   |          |
|    | a. Man-made | -        |
|    | b. Natural  | -        |
|    | c. Other    | \$4,896. |
| 2. | State       |          |
|    | a. Man-made | -        |
|    | b. Natural  | -        |
| 3. | Federal     |          |
|    | a. Man-made | -        |
|    | b. Natural  | -        |

PRIVATE

|    |             |   |
|----|-------------|---|
| 1. | Residential | - |
| 2. | Commercial  | - |
| 3. | Other       | - |

TABLE 6pp

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.

TOWN OF HAMPTON, ROCKINGHAM COUNTY, NEW HAMPSHIRE

PUBLIC

1. Municipal

|    |                                    |           |
|----|------------------------------------|-----------|
| a. | Man-made                           |           |
|    | Debris Clearance                   | \$ 418.   |
|    | Road Systems                       | \$ 91.    |
|    | Public Buildings and Equipment     | \$ 2,552. |
| b. | Natural                            | -         |
| c. | Other                              |           |
|    | Evacuation Center Wages & Supplies | \$ 1,908. |

2. State

|    |                              |           |
|----|------------------------------|-----------|
| a. | Man-made                     |           |
|    | N.H. Public Works Department | \$10,338. |
|    | Equipment Rental for Debris  |           |
|    | Clearance to Route 1A        |           |
| b. | Natural                      | -         |

3. Federal

|    |          |   |
|----|----------|---|
| a. | Man-made | - |
| b. | Natural  | - |

PRIVATE

|    |             |   |
|----|-------------|---|
| 1. | Residential | - |
| 2. | Commercial  | - |
| 3. | Other       | - |

TABLE 6qq

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.

TOWN OF NORTH HAMPTON, ROCKINGHAM COUNTY, NEW HAMPSHIRE

PUBLIC

1. Municipal
  - a. Man-made  
Public Bldgs. & Equipment \$ 5,908.
  - b. Natural -
  - c. Other -
2. State
  - a. Man-made  
NHDPW - Equipment Rental for Rte. 1A  
Debris Clearance \$ 12,236.
  - b. Natural -
3. Federal
  - a. Man-made -
  - b. Natural -

PRIVATE

1. Residential \$105,000.
2. Commercial \$200,000.
3. Other -

TABLE 6rr

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.

TOWN OF RYE, ROCKINGHAM COUNTY, NEW HAMPSHIRE

PUBLIC

1. Municipal
  - a. Man-made -
  - b. Natural -
  - c. Other  
Heat and Electricity for Town Hall \$ 432.  
used by HUD Officials
2. State
  - a. Man-made  
N.H. Department of Public Works \$13,769.  
Equipment Rental for Debris  
Cleanup on Route 1A
  - b. Natural -
3. Federal
  - a. Man-made -
  - b. Natural -

PRIVATE

1. Residential \$ 5,350.
2. Commercial \$29,770.
3. Other -

TABLE 6ss

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.

TOWN OF PORTSMOUTH, ROCKINGHAM COUNTY, NEW HAMPSHIRE

PUBLIC

|    |                              |            |
|----|------------------------------|------------|
| 1. | Municipal                    |            |
| a. | Man-made                     | -          |
| b. | Natural                      | -          |
| c. | Other                        | -          |
| 2. | State                        |            |
| a. | Man-made                     | -          |
| b. | Natural                      | -          |
| 3. | Federal                      |            |
| a. | Man-made                     |            |
|    | U.S. Coast Guard             |            |
|    | Seawalls at Portsmouth Base  | \$100,000. |
|    | Boat Docks at Portsmouth and | \$ 15,500. |
|    | Isle of Shoals Bases         |            |
|    | Buildings at Portsmouth and  | \$ 34,000. |
|    | Isle of Shoals Bases         |            |
| b. | Natural                      | -          |

PRIVATE

|    |             |            |
|----|-------------|------------|
| 1. | Residential | \$ 34,000. |
| 2. | Commercial  |            |
|    | Building    | \$ 43,000. |
|    | Contents    | \$ 4,500.  |

TABLE 6tt

COSTS AND LOSSES NOT REIMBURSED BY F.D.A.A.

TOWN OF NEW CASTLE, ROCKINGHAM COUNTY, NEW HAMPSHIRE

PUBLIC

1. Municipal

a. Man-made -

b. Natural -

c. Other -

2. State

a. Man-made -

b. Natural -

3. Federal

a. Man-made -

b. Natural -

PRIVATE

1. Residential -

2. Commercial -

3. Other -

TABLE 7  
FEDERAL AGENCIES COST AND LOSS ESTIMATE

|  | <u>MASSACHUSETTS</u>         | <u>NEW HAMPSHIRE</u>     |
|--|------------------------------|--------------------------|
| <u>A. INDIVIDUAL ASSISTANCE</u>  |                              |                          |
| 1. Housing and Urban Development<br>Temporary Housing*<br>Federal Insurance Administration                         | \$12,500,000.<br>16,534,000. | \$ 332,800.<br>773,498.  |
| 2. Small Business Administration<br>Home and Personal Loans<br>Business Loans                                      | 80,657,000.<br>67,716,000.   | 1,623,900.<br>2,897,500. |
| 3. Department of Labor<br>Disaster Unemployment Insurance*   | 300,000.                     | 12,320.                  |
| 4. Department of Agriculture<br>Food and Nutrition Service (Food Stamps)<br>Farmers Home Administration            | 4,377,263.<br>872,501.       | -0-<br>-0-               |
| 5. Federal Disaster Assistance Administration<br>Individual and Family Grants*<br>Crisis Counseling, Intervention* | 4,000,000.<br>461,526.       | 42,000.<br>-0-           |
| 6. Internal Revenue Service<br>Casualty Loss   | 483,214.                     | Not Available            |
| 7. Community Services Administration<br>Grants to Local Community Action Agencies<br>for Food and Fuel             | 350,000.                     | -0-                      |
| 8. Health, Education and Welfare - Office on Aging<br>Grants for Special Needs of Elderly                          | 40,000.                      | -0-                      |
| <u>B. PUBLIC ASSISTANCE</u>  |                              |                          |
| 9. Federal Disaster Assistance Administration*   | 20,023,203.                  | 250,070.                 |
| <u>C. FEDERAL AGENCY INDEPENDENT AUTHORITY</u>   |                              |                          |
| 10. Health, Education and Welfare<br>Office of Education   | 5,000,000.                   | -0-                      |
| 11. Federal Highway Administration<br>Federal Aid Roads and Highways   | 1,500,000.                   | 1,800,000.               |
| 12. U.S. Army, Corps of Engineers<br>Operation and Maintenance<br>Emergency Rehabilitation of Flood Projects       | 44,000.<br>-0-               | -0-<br>395,000.          |
| 13. Housing and Urban Development<br>Community Development Block Grants  | 5,465,775.                   | -0-                      |
| <u>D. OFFICE OF THE FEDERAL COORDINATING OFFICER</u>   |                              |                          |
| 14. Mission Assignment Costs*  | 50,000.                      | 22,000.                  |
| TOTAL  | <u>\$220,071,032.</u>        | <u>\$8,149,088.</u>      |

\*Funded by the President's Disaster Relief Fund.



TABLE 8

ADDITIONAL NON-ALLOCATABLE COSTS AND LOSSES

|   |             |
|---|-------------|
| U.S. Army, Massachusetts (Entire State)   | \$ 885,852. |
| Massachusetts National Guard (Entire State)   | 2,254,243.  |
| Rockingham County Commission, N. H. (C.E.T.A.)  | 75,000.     |
| Salvation Army (Revere, Hull, Scituate, Marshfield)   | 52,000.     |
| Comm. of Mass., Disaster Recovery Team<br>(Operation and Coordination)  | 10,000.     |
| U.S. Economic Development Administration,<br>Massachusetts Disaster Recovery Team<br>(Operation and Coordination) | 200,000.    |
| Mission Assignments, Massachusetts (Reimbursed by FDAA)   |             |
| U.S. Army Corps of Engineers  | 50,000.     |
| U.S. Army, New Engl. Div., Corps of Engineers   | 200,000.    |
| Environmental Protection Agency   | 1,000.      |
| Federal Aviation Agency   | 2,500.      |
| Federal Highway Administration  | 25,000.     |
| General Services Administration   | 260,000.    |
| U.S. Coast Guard, Massachusetts<br>Minor Aids to Navigation   | 150,000.    |
| Fishing Gear Lost Off Massachusetts, Cape Cod   | 50,000.     |
| Fishing Gear Lost Off Massachusetts, North Shore  | 400,000.    |

NOTES ON TABLES 9 & 10

1. The figures on "Property Loss," appearing opposite the items "Residential" and "Commercial/Industrial," are estimates provided by community officials. The absence of a figure in these categories is not necessarily indicative of an absence of damage, but rather that no estimate was provided by the community.
2. The figures on "Property Loss," appearing opposite the items "Building" and "Contents" represent approved claims against flood insurance policies for the respective categories. This data, rounded to the nearest \$100, was provided by the Federal Insurance Administration in a special computer run, and represents totals for 1978 as of 15 December 1978. It is assumed that all 1978 claims against flood insurance policies in these communities are attributable to the February storm. Further data, including numbers of claims, is on file in New England Division, Corps of Engineers.
3. The community total includes property loss figures which are either official estimates or claim experience, whichever is greater. It is assumed that where estimated damage exceeds claims, the difference is attributable to uninsured losses. Where claims exceed estimated losses, the claims data is used, although it probably represents only a portion of the true losses for that community.
4. The totals in Table 10, for Residential and Commercial/Industrial Private Property Loss are figures from Small Business Administration's Home and Business Loans, respectively. These figures are assumed to be exclusive of flood insurance claim dollars, and both are included in the grand totals, by State.

TABLE 9a

MUNICIPAL SUMMARY

TOWN OF PROVINCETOWN, BARNSTABLE COUNTY, MASSACHUSETTS

|    |                            |            |
|----|----------------------------|------------|
| A. | Property Loss              |            |
| 1. | Private                    |            |
|    | (a) Residential            | -          |
|    | i. Building                | \$43,100.  |
|    | ii. Contents               | \$ 9,900.  |
|    | (b) Commercial/Industrial  | -          |
|    | i. Building                | \$46,000.  |
|    | ii. Contents               | \$ 1,300.  |
|    | (c) Other                  | -          |
| 2. | Public                     |            |
|    | (a) Local                  | -          |
|    | (b) State                  | -          |
|    | (c) Federal                | \$45,000.  |
| B. | Natural Resource Loss      |            |
| 1. | Commercial                 |            |
|    | (a) Water-Based            | -          |
|    | (b) Land-Based             | -          |
| 2. | Public                     | -          |
| C. | Indirect Expenses Incurred |            |
| 1. | Private                    |            |
|    | (a) Residential            | -          |
|    | (b) Commercial/Industrial  | -          |
|    | (c) Other                  | \$ 970.    |
| 2. | Public                     |            |
|    | (a) Local                  | \$ 164.    |
|    | (b) State                  | -          |
|    | (c) Federal                | \$46,470.  |
| D. | Total                      | \$192,904. |

TABLE 9b

MUNICIPAL SUMMARY

TOWN OF TRURO, BARNSTABLE COUNTY, MASSACHUSETTS

|    |                            |           |
|----|----------------------------|-----------|
| A. | Property Loss              |           |
| 1. | Private                    |           |
|    | (a) Residential            | -         |
|    | i. Building                | -         |
|    | ii. Contents               | -         |
|    | (b) Commercial/Industrial  | -         |
|    | i. Building                | -         |
|    | ii. Contents               | -         |
|    | (c) Other                  | -         |
| 2. | Public                     |           |
|    | (a) Local                  | \$56,796. |
|    | (b) State                  | -         |
|    | (c) Federal                | \$ 7,000. |
| B. | Natural Resource Loss      |           |
| 1. | Commercial                 |           |
|    | (a) Water-Based            | -         |
|    | (b) Land-Based             | -         |
| 2. | Public                     | -         |
| C. | Indirect Expenses Incurred |           |
| 1. | Private                    |           |
|    | (a) Residential            | -         |
|    | (b) Commercial/Industrial  | -         |
|    | (c) Other                  | -         |
| 2. | Public                     |           |
|    | (a) Local                  | -         |
|    | (b) State                  | -         |
|    | (c) Federal                | -         |
| D. | Total                      | \$63,796. |

TABLE 9c

MUNICIPAL SUMMARY

TOWN OF WELFLEET, BARNSTABLE COUNTY, MASSACHUSETTS

|    |                            |           |
|----|----------------------------|-----------|
| A. | Property Loss              |           |
| 1. | Private                    |           |
|    | (a) Residential            | -         |
|    | i. Building                | \$36,900. |
|    | ii. Contents               | -         |
|    | (b) Commercial/Industrial  | -         |
|    | i. Building                | -         |
|    | ii. Contents               | -         |
|    | (c) Other                  | \$ 2,000. |
| 2. | Public                     |           |
|    | (a) Local                  | \$18,114. |
|    | (b) State                  | -         |
|    | (c) Federal                | -         |
| B. | Natural Resource Loss      |           |
| 1. | Commercial                 |           |
|    | (a) Water-Based            | -         |
|    | (b) Land-Based             | -         |
| 2. | Public                     | \$ 3,557. |
| C. | Indirect Expenses Incurred |           |
| 1. | Private                    |           |
|    | (a) Residential            | -         |
|    | (b) Commercial/Industrial  | -         |
|    | (c) Other                  | -         |
| 2. | Public                     |           |
|    | (a) Local                  | \$ 7,800. |
|    | (b) State                  | -         |
|    | (c) Federal                | \$ 1,657. |
| D. | Total                      | \$70,028. |

TABLE 9d

MUNICIPAL SUMMARY

TOWN OF EASTHAM, BARNSTABLE COUNTY, MASSACHUSETTS

|     |                            |              |
|-----|----------------------------|--------------|
| A.  | Property Loss              |              |
| 1.  | Private                    |              |
| (a) | Residential                | -            |
| i.  | Building                   | \$24,400.    |
| ii. | Contents                   | \$ 1,100.    |
| (b) | Commercial/Industrial      |              |
| i.  | Building                   | -            |
| ii. | Contents                   | -            |
| (c) | Other                      | \$ 28,000.   |
| 2.  | Public                     |              |
| (a) | Local                      | \$ 595.      |
| (b) | State                      | -            |
| (c) | Federal                    | \$2,015,000. |
| B.  | Natural Resource Loss      |              |
| 1.  | Commercial                 |              |
| (a) | Water-Based                | -            |
| (b) | Land-Based                 | -            |
| 2.  | Public                     | -            |
| C.  | Indirect Expenses Incurred |              |
| 1.  | Private                    |              |
| (a) | Residential                | -            |
| (b) | Commercial/Industrial      | -            |
| (c) | Other                      | -            |
| 2.  | Public                     |              |
| (a) | Local                      | -            |
| (b) | State                      | -            |
| (c) | Federal                    | \$ 100,272.  |
| D.  | Total                      | \$2,169,367. |

TABLE 9e

MUNICIPAL SUMMARY

TOWN OF ORLEANS, BARNSTABLE COUNTY, MASSACHUSETTS

|    |                            |           |
|----|----------------------------|-----------|
| A. | Property Loss              |           |
| 1. | Private                    |           |
|    | (a) Residential            | \$ 2,000. |
|    | i. Building                | \$ 2,400. |
|    | ii. Contents               | -         |
|    | (b) Commercial/Industrial  |           |
|    | i. Building                | -         |
|    | ii. Contents               | -         |
|    | (c) Other                  | \$ 2,500. |
| 2. | Public                     |           |
|    | (a) Local                  | -         |
|    | (b) State                  | -         |
|    | (c) Federal                | -         |
| B. | Natural Resource Loss      |           |
| 1. | Commercial                 |           |
|    | (a) Water-Based            | -         |
|    | (b) Land-Based             | -         |
| 2. | Public                     | \$ 1,309. |
| C. | Indirect Expenses Incurred |           |
| 1. | Private                    |           |
|    | (a) Residential            | -         |
|    | (b) Commercial/Industrial  | -         |
|    | (c) Other                  | -         |
| 2. | Public                     |           |
|    | (a) Local                  | -         |
|    | (b) State                  | -         |
|    | (c) Federal                | \$ 6,674. |
| D. | Total                      | \$12,883. |

TABLE 9f

MUNICIPAL SUMMARY

TOWN OF BREWSTER, BARNSTABLE COUNTY, MASSACHUSETTS

|     |                            |           |
|-----|----------------------------|-----------|
| A.  | Property Loss              |           |
| 1.  | Private                    |           |
| (a) | Residential                | \$ 1,000. |
| i.  | Building                   | -         |
| ii. | Contents                   | -         |
| (b) | Commercial/Industrial      | -         |
| i.  | Building                   | -         |
| ii. | Contents                   | -         |
| (c) | Other                      | -         |
| 2.  | Public                     |           |
| (a) | Local                      | \$16,965. |
| (b) | State                      | -         |
| (c) | Federal                    | -         |
| B.  | Natural Resource Loss      |           |
| 1.  | Commercial                 |           |
| (a) | Water-Based                | -         |
| (b) | Land-Based                 | -         |
| 2.  | Public                     | -         |
| C.  | Indirect Expenses Incurred |           |
| 1.  | Private                    |           |
| (a) | Residential                | -         |
| (b) | Commercial/Industrial      | -         |
| (c) | Other                      | -         |
| 2.  | Public                     |           |
| (a) | Local                      | -         |
| (b) | State                      | -         |
| (c) | Federal                    | \$ 5,565. |
| D.  | Total                      | \$23,530. |



TABLE 9g

MUNICIPAL SUMMARY

TOWN OF DENNIS, BARNSTABLE COUNTY, MASSACHUSETTS

|    |                            |            |
|----|----------------------------|------------|
| A. | Property Loss              |            |
| 1. | Private                    |            |
|    | (a) Residential            | \$ 3,000.  |
|    | i. Building                | \$14,000.  |
|    | ii. Contents               | \$ 3,000.  |
|    | (b) Commercial/Industrial  | -          |
|    | i. Building                | \$ 2,900.  |
|    | ii. Contents               | -          |
|    | (c) Other                  | -          |
| 2. | Public                     |            |
|    | (a) Local                  | \$42,967.  |
|    | (b) State                  | -          |
|    | (c) Federal                | -          |
| B. | Natural Resource Loss      |            |
| 1. | Commercial                 |            |
|    | (a) Water-Based            | -          |
|    | (b) Land-Based             | -          |
| 2. | Public                     | -          |
| C. | Indirect Expenses Incurred |            |
| 1. | Private                    |            |
|    | (a) Residential            | -          |
|    | (b) Commercial/Industrial  | -          |
|    | (c) Other                  | -          |
| 2. | Public                     |            |
|    | (a) Local                  | -          |
|    | (b) State                  | -          |
|    | (c) Federal                | \$46,681.  |
| D. | Total                      | \$106,648. |

TABLE 9h

MUNICIPAL SUMMARY

TOWN OF YARMOUTH, BARNSTABLE COUNTY, MASSACHUSETTS

|     |                            |           |
|-----|----------------------------|-----------|
| A.  | Property Loss              |           |
| 1.  | Private                    |           |
| (a) | Residential                | -         |
| i.  | Building                   | \$ 9,200. |
| ii. | Contents                   | -         |
| (b) | Commercial/Industrial      |           |
| i.  | Building                   | -         |
| ii. | Contents                   | -         |
| (c) | Other                      | -         |
| 2.  | Public                     |           |
| (a) | Local                      | \$20,468. |
| (b) | State                      | -         |
| (c) | Federal                    | -         |
| B.  | Natural Resource Loss      |           |
| 1.  | Commercial                 |           |
| (a) | Water-Based                | -         |
| (b) | Land-Based                 | -         |
| 2.  | Public                     | -         |
| C.  | Indirect Expenses Incurred |           |
| 1.  | Private                    |           |
| (a) | Residential                | -         |
| (b) | Commercial/Industrial      | -         |
| (c) | Other                      | -         |
| 2.  | Public                     |           |
| (a) | Local                      | \$18,000. |
| (b) | State                      | -         |
| (c) | Federal                    | \$27,818. |
| D.  | Total                      | \$75,486. |

TABLE 9i

MUNICIPAL SUMMARY

TOWN OF BARNSTABLE, BARNSTABLE COUNTY, MASSACHUSETTS

|    |                            |            |
|----|----------------------------|------------|
| A. | Property Loss              |            |
| 1. | Private                    |            |
|    | (a) Residential            | -          |
|    | i. Building                | \$14,000.  |
|    | ii. Contents               | \$ 5,000.  |
|    | (b) Commercial/Industrial  | -          |
|    | i. Building                | \$25,000   |
|    | ii. Contents               | \$13,000   |
|    | (c) Other                  | -          |
| 2. | Public                     |            |
|    | (a) Local                  | \$21,830.  |
|    | (b) State                  | -          |
|    | (c) Federal                | -          |
| B. | Natural Resource Loss      |            |
| 1. | Commercial                 |            |
|    | (a) Water-Based            | -          |
|    | (b) Land-Based             | -          |
| 2. | Public                     | \$ 6,758.  |
| C. | Indirect Expenses Incurred |            |
| 1. | Private                    |            |
|    | (a) Residential            | -          |
|    | (b) Commercial/Industrial  | -          |
|    | (c) Other                  | -          |
| 2. | Public                     |            |
|    | (a) Local                  | \$20,973.  |
|    | (b) State                  | -          |
|    | (c) Federal                | \$ 3,169.  |
| D. | Total                      | \$109,730. |

TABLE 9j

MUNICIPAL SUMMARY

TOWN OF SANDWICH, BARNSTABLE COUNTY, MASSACHUSETTS

|    |                            |           |
|----|----------------------------|-----------|
| A. | Property Loss              |           |
| 1. | Private                    |           |
|    | (a) Residential            | -         |
|    | i. Building                | \$ 3,900. |
|    | ii. Contents               | -         |
|    | (b) Commercial/Industrial  | -         |
|    | i. Building                | -         |
|    | ii. Contents               | -         |
|    | (c) Other                  | \$ 850.   |
| 2. | Public                     |           |
|    | (a) Local                  | -         |
|    | (b) State                  | -         |
|    | (c) Federal                | -         |
| B. | Natural Resource Loss      |           |
| 1. | Commercial                 |           |
|    | (a) Water-Based            | -         |
|    | (b) Land-Based             | -         |
| 2. | Public                     | -         |
| C. | Indirect Expenses Incurred |           |
| 1. | Private                    |           |
|    | (a) Residential            | -         |
|    | (b) Commercial/Industrial  | -         |
|    | (c) Other                  | -         |
| 2. | Public                     |           |
|    | (a) Local                  | -         |
|    | (b) State                  | -         |
|    | (c) Federal                | \$11,789. |
| D. | Total                      | \$16,539. |

TABLE 9k

MUNICIPAL SUMMARY

TOWN OF BOURNE, BARNSTABLE COUNTY, MASSACHUSETTS

A. Property Loss

1. Private

(a) Residential

-

i. Building

\$ 6,200.

ii. Contents

\$ 3,100.

(b) Commercial/Industrial

-

i. Building

-

ii. Contents

-

(c) Other

\$ 8,463.

2. Public

(a) Local

\$15,973.

(b) State

-

(c) Federal

-

B. Natural Resource Loss

1. Commercial

(a) Water-Based

-

(b) Land-Based

-

2. Public

-

C. Indirect Expenses Incurred

1. Private

(a) Residential

-

(b) Commercial/Industrial

-

(c) Other

-

2. Public

(a) Local

-

(b) State

-

(c) Federal

\$18,298.

D. Total

\$52,034.

TABLE 91

MUNICIPAL SUMMARY

TOWN OF PLYMOUTH, PLYMOUTH COUNTY, MASSACHUSETTS

|    |                            |               |
|----|----------------------------|---------------|
| A. | Property Loss              |               |
| 1. | Private                    |               |
|    | (a) Residential            | \$ 3,130,000. |
|    | i. Building                | \$ 251,700.   |
|    | ii. Contents               | \$ 39,900.    |
|    | (b) Commercial/Industrial  | \$ 903,500.   |
|    | i. Building                | \$ 51,600.    |
|    | ii. Contents               | \$ 67,000.    |
|    | (c) Other                  | \$ 425,000.   |
| 2. | Public                     |               |
|    | (a) Local                  | \$ 1,314,100. |
|    | (b) State                  | -             |
|    | (c) Federal                | -             |
| B. | Natural Resource Loss      |               |
| 1. | Commercial                 |               |
|    | (a) Water-Based            | -             |
|    | (b) Land-Based             | -             |
| 2. | Public                     | \$ 3,028,841. |
| C. | Indirect Expenses Incurred |               |
| 1. | Private                    |               |
|    | (a) Residential            | -             |
|    | (b) Commercial/Industrial  | \$ 243,200.   |
|    | (c) Other                  | \$ 13,508.    |
| 2. | Public                     |               |
|    | (a) Local                  | \$ 779,987.   |
|    | (b) State                  | -             |
|    | (c) Federal                | \$ 199,194.   |
| D. | Total                      | \$10,037,330. |

TABLE 9m

MUNICIPAL SUMMARY

TOWN OF KINGSTON, PLYMOUTH COUNTY, MASSACHUSETTS

A. Property Loss

1. Private

(a) Residential

|              |    |      |
|--------------|----|------|
| i. Building  | \$ | 600. |
| ii. Contents | \$ | 800. |

(b) Commercial/Industrial

|              |    |        |
|--------------|----|--------|
| i. Building  | \$ | 3,900. |
| ii. Contents |    | -      |

(c) Other

2. Public

|             |    |         |
|-------------|----|---------|
| (a) Local   | \$ | 59,553. |
| (b) State   |    | -       |
| (c) Federal |    | -       |

B. Natural Resource Loss

1. Commercial

|                 |  |   |
|-----------------|--|---|
| (a) Water-Based |  | - |
| (b) Land-Based  |  | - |

|           |    |        |
|-----------|----|--------|
| 2. Public | \$ | 1,075. |
|-----------|----|--------|

C. Indirect Expenses Incurred

1. Private

|                           |  |   |
|---------------------------|--|---|
| (a) Residential           |  | - |
| (b) Commercial/Industrial |  | - |
| (c) Other                 |  | - |

2. Public

|             |    |          |
|-------------|----|----------|
| (a) Local   | \$ | 800,490. |
| (b) State   |    | -        |
| (c) Federal | \$ | 38,156.  |

|          |    |          |
|----------|----|----------|
| D. Total | \$ | 904,574. |
|----------|----|----------|

TABLE 9n

MUNICIPAL SUMMARY

TOWN OF DUXBURY, PLYMOUTH COUNTY, MASSACHUSETTS

|     |                            |             |
|-----|----------------------------|-------------|
| A.  | Property Loss              |             |
| 1.  | Private                    |             |
| (a) | Residential                | \$ 26,000.  |
| i.  | Building                   | \$ 275,300. |
| ii. | Contents                   | \$ 56,600.  |
| (b) | Commercial/Industrial      | \$ 3,000.   |
| i.  | Building                   | \$ 100.     |
| ii. | Contents                   | \$ 17,600.  |
| (c) | Other                      | -           |
| 2.  | Public                     |             |
| (a) | Local                      | \$ 79,713.  |
| (b) | State                      | -           |
| (c) | Federal                    | \$ 5,000.   |
| B.  | Natural Resource Loss      |             |
| 1.  | Commercial                 |             |
| (a) | Water-Based                | -           |
| (b) | Land-Based                 | -           |
| 2.  | Public                     | \$ 103,427. |
| C.  | Indirect Expenses Incurred |             |
| 1.  | Private                    |             |
| (a) | Residential                | -           |
| (b) | Commercial/Industrial      | -           |
| (c) | Other                      | \$ 3,359.   |
| 2.  | Public                     |             |
| (a) | Local                      | \$ 948.     |
| (b) | State                      | -           |
| (c) | Federal                    | \$ 21,740.  |
| D.  | Total                      | \$ 563,787. |



TABLE 9o

MUNICIPAL SUMMARY

TOWN OF MARSHFIELD, PLYMOUTH COUNTY, MASSACHUSETTS

A. Property Loss

1. Private

(a) Residential \$ 40,000,000.

i. Building \$ 620,400.  
ii. Contents \$ 156,100.

(b) Commercial/Industrial \$ 39,000.

i. Building \$ 31,900.  
ii. Contents \$ 50,500.

(c) Other -

2. Public

(a) Local \$ 1,144,417.

(b) State -

(c) Federal -

B. Natural Resource Loss

1. Commercial

(a) Water-Based -

(b) Land-Based -

2. Public \$ 1,850.

C. Indirect Expenses Incurred

1. Private

(a) Residential -

(b) Commercial/Industrial -

(c) Other \$ 12,000.

2. Public

(a) Local \$ 34,396.

(b) State -

(c) Federal \$ 175,593.

D. Total \$41,450,656.

TABLE 9p

MUNICIPAL SUMMARY

TOWN OF SCITUATE, PLYMOUTH COUNTY, MASSACHUSETTS

|    |                            |               |
|----|----------------------------|---------------|
| A. | Property Loss              |               |
| 1. | Private                    |               |
|    | (a) Residential            | \$ 5,267,046. |
|    | i. Building                | \$ 5,900,100. |
|    | ii. Contents               | \$ 1,186,900. |
|    | (b) Commercial/Industrial  | \$ 358,487.   |
|    | i. Building                | \$ 133,400.   |
|    | ii. Contents               | \$ 97,700.    |
|    | (c) Other                  | \$ 368,000.   |
| 2. | Public                     |               |
|    | (a) Local                  | \$ 7,114,492. |
|    | (b) State                  | -             |
|    | (c) Federal                | \$ 56,000.    |
| B. | Natural Resource Loss      |               |
| 1. | Commercial                 |               |
|    | (a) Water-Based            | -             |
|    | (b) Land-Based             | -             |
| 2. | Public                     | -             |
| C. | Indirect Expenses Incurred |               |
| 1. | Private                    |               |
|    | (a) Residential            | -             |
|    | (b) Commercial/Industrial  | -             |
|    | (c) Other                  | \$ 114,050.   |
| 2. | Public                     |               |
|    | (a) Local                  | \$ 245,830.   |
|    | (b) State                  | -             |
|    | (c) Federal                | \$ 731,063.   |
| D. | Total                      | \$16,074,922. |

TABLE 9g

MUNICIPAL SUMMARY

TOWN OF HULL, PLYMOUTH COUNTY, MASSACHUSETTS

A. Property Loss

1. Private

|                           |               |
|---------------------------|---------------|
| (a) Residential           | \$10,000,000. |
| i. Building               | \$ 1,682,700. |
| ii. Contents              | \$ 551,600.   |
| (b) Commercial/Industrial | \$ 2,000,000. |
| i. Building               | \$ 135,600.   |
| ii. Contents              | \$ 131,000.   |
| (c) Other                 | -             |

2. Public

|             |               |
|-------------|---------------|
| (a) Local   | \$ 4,035,373. |
| (b) State   | \$ 114,415.   |
| (c) Federal | \$ 220,000.   |

B. Natural Resource Loss

1. Commercial

|                 |   |
|-----------------|---|
| (a) Water-Based | - |
| (b) Land-Based  | - |

|           |             |
|-----------|-------------|
| 2. Public | \$ 300,000. |
|-----------|-------------|

C. Indirect Expenses Incurred

1. Private

|                           |             |
|---------------------------|-------------|
| (a) Residential           | -           |
| (b) Commercial/Industrial | -           |
| (c) Other                 | \$ 656,935. |

2. Public

|             |             |
|-------------|-------------|
| (a) Local   | \$ 215,641. |
| (b) State   | -           |
| (c) Federal | \$ 210,097. |

|          |               |
|----------|---------------|
| D. Total | \$17,752,461. |
|----------|---------------|

TABLE 9r

MUNICIPAL SUMMARY

TOWN OF HINGHAM, PLYMOUTH COUNTY, MASSACHUSETTS

|    |                            |             |
|----|----------------------------|-------------|
| A. | Property Loss              |             |
| 1. | Private                    |             |
|    | (a) Residential            | \$ 100,000. |
|    | i. Building                | \$ 34,300.  |
|    | ii. Contents               | \$ 12,800.  |
|    | (b) Commercial/Industrial  | -           |
|    | i. Building                | \$ 10,000.  |
|    | ii. Contents               | \$ 11,000.  |
|    | (c) Other                  | -           |
| 2. | Public                     |             |
|    | (a) Local                  | \$ 118,405. |
|    | (b) State                  | -           |
|    | (c) Federal                | -           |
| B. | Natural Resource Loss      |             |
| 1. | Commercial                 |             |
|    | (a) Water-Based            | -           |
|    | (b) Land-Based             | -           |
| 2. | Public                     | \$ 575.     |
| C. | Indirect Expenses Incurred |             |
| 1. | Private                    |             |
|    | (a) Residential            | -           |
|    | (b) Commercial/Industrial  | -           |
|    | (c) Other                  | -           |
| 2. | Public                     |             |
|    | (a) Local                  | \$ 13,206.  |
|    | (b) State                  | -           |
|    | (c) Federal                | \$ 6,447.   |
| D. | Total                      | \$ 259,633. |

TABLE 9s

MUNICIPAL SUMMARY

TOWN OF COHASSET, NORFOLK COUNTY, MASSACHUSETTS

A. Property Loss

1. Private

(a) Residential

-

i. Building

\$ 30,500.

ii. Contents

\$ 700.

(b) Commercial/Industrial

\$ 229,000.

i. Building

-

ii. Contents

-

(c) Other

-

2. Public

(a) Local

\$ 651,969.

(b) State

-

(c) Federal

-

B. Natural Resource Loss

1. Commercial

(a) Water-Based

-

(b) Land-Based

-

2. Public

\$ 55,120.

C. Indirect Expenses Incurred

1. Private

(a) Residential

-

(b) Commercial/Industrial

-

(c) Other

\$ 789.

2. Public

(a) Local

-

(b) State

-

(c) Federal

\$ 137,619.

D. Total

\$1,105,697.

TABLE 9t

MUNICIPAL SUMMARY

TOWN OF WEYMOUTH, NORFOLK COUNTY, MASSACHUSETTS

|     |                            |            |
|-----|----------------------------|------------|
| A.  | Property Loss              |            |
| 1.  | Private                    |            |
| (a) | Residential                | -          |
| i.  | Building                   | \$20,400.  |
| ii. | Contents                   | \$ 6,800.  |
| (b) | Commercial/Industrial      | -          |
| i.  | Building                   | \$ 1,200.  |
| ii. | Contents                   | \$ 7,600.  |
| (c) | Other                      | -          |
| 2.  | Public                     |            |
| (a) | Local                      | \$ 2,434.  |
| (b) | State                      | -          |
| (c) | Federal                    | -          |
| B.  | Natural Resource Loss      |            |
| 1.  | Commercial                 |            |
| (a) | Water-Based                | -          |
| (b) | Land-Based                 | -          |
| 2.  | Public                     | \$32,662.  |
| C.  | Indirect Expenses Incurred |            |
| 1.  | Private                    |            |
| (a) | Residential                | -          |
| (b) | Commercial/Industrial      | -          |
| (c) | Other                      | \$ 2,722.  |
| 2.  | Public                     |            |
| (a) | Local                      | \$53,341.  |
| (b) | State                      | -          |
| (c) | Federal                    | \$ 2,410.  |
| D.  | Total                      | \$129,569. |

TABLE 9u

MUNICIPAL SUMMARY

TOWN OF BRAINTREE, NORFOLK COUNTY, MASSACHUSETTS

|     |                            |           |
|-----|----------------------------|-----------|
| A.  | Property Loss              |           |
| 1.  | Private                    |           |
| (a) | Residential                | -         |
| i.  | Building                   | \$ 800.   |
| ii. | Contents                   | -         |
| (b) | Commercial/Industrial      | -         |
| i.  | Building                   | \$ 700.   |
| ii. | Contents                   | \$ 7,800. |
| (c) | Other                      | -         |
| 2.  | Public                     |           |
| (a) | Local                      | \$22,616. |
| (b) | State                      | -         |
| (c) | Federal                    | -         |
| B.  | Natural Resource Loss      |           |
| 1.  | Commercial                 |           |
| (a) | Water-Based                | -         |
| (b) | Land-Based                 | -         |
| 2.  | Public                     | -         |
| C.  | Indirect Expenses Incurred |           |
| 1.  | Private                    |           |
| (a) | Residential                | -         |
| (b) | Commercial/Industrial      | -         |
| (c) | Other                      | \$15,000. |
| 2.  | Public                     |           |
| (a) | Local                      | -         |
| (b) | State                      | -         |
| (c) | Federal                    | \$ 1,350. |
| D.  | Total                      | \$48,266. |

TABLE 9v

MUNICIPAL SUMMARY

CITY OF QUINCY, NORFOLK COUNTY, MASSACHUSETTS

|    |                            |              |
|----|----------------------------|--------------|
| A. | Property Loss              |              |
| 1. | Private                    |              |
|    | (a) Residential            | \$ 945,250.  |
|    | i. Building                | \$ 398,900.  |
|    | ii. Contents               | \$ 142,000.  |
|    | (b) Commercial/Industrial  | \$ 675,000.  |
|    | i. Building                | \$ 2,600.    |
|    | ii. Contents               | \$ 16,900.   |
|    | (c) Other                  | -            |
| 2. | Public                     |              |
|    | (a) Local                  | \$ 61,606.   |
|    | (b) State                  | \$ 1,000.    |
|    | (c) Federal                | -            |
| B. | Natural Resource Loss      |              |
| 1. | Commercial                 |              |
|    | (a) Water-Based            | -            |
|    | (b) Land-Based             | -            |
| 2. | Public                     | -            |
| C. | Indirect Expenses Incurred |              |
| 1. | Private                    |              |
|    | (a) Residential            | -            |
|    | (b) Commercial/Industrial  | -            |
|    | (c) Other                  | \$ 72,705.   |
| 2. | Public                     |              |
|    | (a) Local                  | \$ 528,139.  |
|    | (b) State                  | -            |
|    | (c) Federal                | \$ 25,640.   |
| D. | Total                      | \$2,309,340. |



TABLE 9w

MUNICIPAL SUMMARY

CITY OF BOSTON, SUFFOLK COUNTY, MASSACHUSETTS

|     |                            |              |
|-----|----------------------------|--------------|
| A.  | Property Loss              |              |
| 1.  | Private                    |              |
| (a) | Residential                | -            |
| i.  | Building                   | -            |
| ii. | Contents                   | -            |
| (b) | Commercial/Industrial      | \$1,083,000. |
| i.  | Building                   | \$ 152,100.  |
| ii. | Contents                   | \$ 10,900.   |
| (c) | Other                      | -            |
| 2.  | Public                     |              |
| (a) | Local                      | \$1,601,050. |
| (b) | State                      | \$ 31,930.   |
| (c) | Federal                    | \$ 50,000.   |
| B.  | Natural Resource Loss      |              |
| 1.  | Commercial                 |              |
| (a) | Water-Based                | -            |
| (b) | Land-Based                 | -            |
| 2.  | Public                     | \$ 60,000.   |
| C.  | Indirect Expenses Incurred |              |
| 1.  | Private                    |              |
| (a) | Residential                | -            |
| (b) | Commercial/Industrial      | -            |
| (c) | Other                      | \$ 95,473.   |
| 2.  | Public                     |              |
| (a) | Local                      | \$2,256,277. |
| (b) | State                      | -            |
| (c) | Federal                    | \$ 344,301.  |
| D.  | Total                      | \$5,522,031. |

TABLE 9x

MUNICIPAL SUMMARY

TOWN OF WINTHROP, SUFFOLK COUNTY, MASSACHUSETTS

|     |                            |              |
|-----|----------------------------|--------------|
| A.  | Property Loss              |              |
| 1.  | Private                    |              |
| (a) | Residential                | \$1,500,000. |
| i.  | Building                   | \$ 472,500.  |
| ii. | Contents                   | \$ 71,500.   |
| (b) | Commercial/Industrial      | \$ 500,000.  |
| i.  | Building                   | \$ 10,700.   |
| ii. | Contents                   | -            |
| (c) | Other                      | -            |
| 2.  | Public                     |              |
| (a) | Local                      | \$ 109,012.  |
| (b) | State                      | -            |
| (c) | Federal                    | -            |
| B.  | Natural Resource Loss      |              |
| 1.  | Commercial                 |              |
| (a) | Water-Based                | -            |
| (b) | Land-Based                 | -            |
| 2.  | Public                     | \$ 60,000.   |
| C.  | Indirect Expenses Incurred |              |
| 1.  | Private                    |              |
| (a) | Residential                | -            |
| (b) | Commercial/Industrial      | -            |
| (c) | Other                      | \$ 350,000.  |
| 2.  | Public                     |              |
| (a) | Local                      | -            |
| (b) | State                      | -            |
| (c) | Federal                    | \$ 61,098.   |
| D.  | Total                      | \$2,325,583. |

TABLE 9y

MUNICIPAL SUMMARY

CITY OF REVERE, SUFFOLK COUNTY, MASSACHUSETTS

A. Property Loss

1. Private

(a) Residential

\$ 2,000,000.

i. Building

\$ 1,519,400.

ii. Contents

\$ 627,900.

(b) Commercial/Industrial

\$13,151,450.

i. Building

\$ 60,300.

ii. Contents

\$ 92,400.

(c) Other

-

2. Public

(a) Local

\$ 217,527.

(b) State

-

(c) Federal

-

B. Natural Resource Loss

1. Commercial

(a) Water-Based

-

(b) Land-Based

-

2. Public

\$ 60,000.

C. Indirect Expenses Incurred

1. Private

(a) Residential

-

(b) Commercial/Industrial

-

(c) Other

\$ 400,000.

2. Public

(a) Local

-

(b) State

-

(c) Federal

\$ 163,751.

D. Total

\$16,140,028.

TABLE 9z

MUNICIPAL SUMMARY

CITY OF LYNN, ESSEX COUNTY, MASSACHUSETTS

|    |                            |               |
|----|----------------------------|---------------|
| A. | Property Loss              |               |
| 1. | Private                    |               |
|    | (a) Residential            | \$ 200,000.   |
|    | i. Building                | \$ 3,500.     |
|    | ii. Contents               | \$ 1,400.     |
|    | (b) Commercial/Industrial  | \$10,000,000. |
|    | i. Building                | -             |
|    | ii. Contents               | -             |
|    | (c) Other                  | -             |
| 2. | Public                     |               |
|    | (a) Local                  | \$ 14,425.    |
|    | (b) State                  | \$ 22,562.    |
|    | (c) Federal                | -             |
| B. | Natural Resource Loss      |               |
| 1. | Commercial                 |               |
|    | (a) Water-Based            | -             |
|    | (b) Land-Based             | -             |
| 2. | Public                     | \$ 70,000.    |
| C. | Indirect Expenses Incurred |               |
| 1. | Private                    |               |
|    | (a) Residential            | -             |
|    | (b) Commercial/Industrial  | -             |
|    | (c) Other                  | \$ 2,506.     |
| 2. | Public                     |               |
|    | (a) Local                  | -             |
|    | (b) State                  | -             |
|    | (c) Federal                | \$ 1,163.     |
| D. | Total                      | \$10,310,656. |

TABLE 9aa

MUNICIPAL SUMMARY

TOWN OF NAHANT, ESSEX COUNTY, MASSACHUSETTS

A. Property Loss

1. Private

(a) Residential \$1,000,000.

i. Building \$ 343,800.

ii. Contents \$ 140,700.

(b) Commercial/Industrial \$ 77,000.

i. Building \$ 39,900.

ii. Contents \$ 13,400.

(c) Other -

2. Public

(a) Local \$ 645,842.

(b) State \$ 548,536.

(c) Federal \$ 10,000.

B. Natural Resource Loss

1. Commercial

(a) Water-Based -

(b) Land-Based -

2. Public \$ 70,000.

C. Indirect Expenses Incurred

1. Private

(a) Residential -

(b) Commercial/Industrial -

(c) Other \$ 12,000.

2. Public

(a) Local \$ 14,597.

(b) State -

(c) Federal \$ 549,679.

D. Total \$2,927,654.

TABLE 9bb

MUNICIPAL SUMMARY

TOWN OF SWAMPSCOTT, ESSEX COUNTY, MASSACHUSETTS

|    |                            |            |
|----|----------------------------|------------|
| A. | Property Loss              |            |
| 1. | Private                    |            |
|    | (a) Residential            | \$ 8,597.  |
|    | i. Building                | \$191,600. |
|    | ii. Contents               | \$ 49,300. |
|    | (b) Commercial/Industrial  | \$ 49,000. |
|    | i. Building                | \$ 42,500. |
|    | ii. Contents               | \$ 4,400.  |
|    | (c) Other                  | -          |
| 2. | Public                     | -          |
|    | (a) Local                  | \$216,530. |
|    | (b) State                  | \$ 8,456.  |
|    | (c) Federal                | -          |
| B. | Natural Resource Loss      |            |
| 1. | Commercial                 |            |
|    | (a) Water-Based            | -          |
|    | (b) Land-Based             | -          |
| 2. | Public                     | -          |
| C. | Indirect Expenses Incurred |            |
| 1. | Private                    |            |
|    | (a) Residential            | -          |
|    | (b) Commercial/Industrial  | -          |
|    | (c) Other                  | \$ 2,506.  |
| 2. | Public                     |            |
|    | (a) Local                  | -          |
|    | (b) State                  | -          |
|    | (c) Federal                | \$ 48,907. |
| D. | Total                      | \$566,299. |

TABLE 9cc

MUNICIPAL SUMMARY

TOWN OF MARBLEHEAD, ESSEX COUNTY, MASSACHUSETTS

|    |                            |            |
|----|----------------------------|------------|
| A. | Property Loss              |            |
| 1. | Private                    |            |
|    | (a) Residential            | -          |
|    | i. Building                | \$138,100. |
|    | ii. Contents               | \$ 17,800. |
|    | (b) Commercial/Industrial  | \$ 17,000. |
|    | i. Building                | \$ 22,600. |
|    | ii. Contents               | \$ 32,400. |
|    | (c) Other                  | -          |
| 2. | Public                     |            |
|    | (a) Local                  | \$329,812. |
|    | (b) State                  | -          |
|    | (c) Federal                | -          |
| B. | Natural Resource Loss      |            |
| 1. | Commercial                 |            |
|    | (a) Water-Based            | -          |
|    | (b) Land-Based             | -          |
| 2. | Public                     | -          |
| C. | Indirect Expenses Incurred |            |
| 1. | Private                    |            |
|    | (a) Residential            | -          |
|    | (b) Commercial/Industrial  | -          |
|    | (c) Other                  | \$ 2,507.  |
| 2. | Public                     |            |
|    | (a) Local                  | -          |
|    | (b) State                  | -          |
|    | (c) Federal                | \$ 76,539. |
| D. | Total                      | \$619,758. |

TABLE 9dd

MUNICIPAL SUMMARY

CITY OF SALEM, ESSEX COUNTY, MASSACHUSETTS

A. Property Loss

1. Private

(a) Residential

-

i. Building \$ 7,900.

ii. Contents \$ 2,000.

(b) Commercial/Industrial \$ 66,984.

i. Building \$ 9,300.

ii. Contents \$ 1,000.

(c) Other \$ 8,411.

2. Public

(a) Local \$ 49,385.

(b) State \$ 8,275.

(c) Federal -

B. Natural Resource Loss

1. Commercial

(a) Water-Based -

(b) Land-Based -

2. Public -

C. Indirect Expenses Incurred

1. Private

(a) Residential -

(b) Commercial/Industrial -

(c) Other \$ 8,050.

2. Public

(a) Local \$ 136.

(b) State -

(c) Federal \$ 91,873.

D. Total \$243,014.



TABLE 9ee

MUNICIPAL SUMMARY

CITY OF BEVERLY, ESSEX COUNTY, MASSACHUSETTS

A. Property Loss

1. Private

(a) Residential

- i. Building
- ii. Contents

\$ 11,200.  
\$ 9,900.

(b) Commercial/Industrial

\$ 40,000.

- i. Building
- ii. Contents

-

-

(c) Other

-

2. Public

(a) Local

\$ 75,043.

(b) State

-

(c) Federal

-

B. Natural Resource Loss

1. Commercial

- (a) Water-Based
- (b) Land-Based

-

-

2. Public

-

C. Indirect Expenses Incurred

1. Private

- (a) Residential
- (b) Commercial/Industrial
- (c) Other

-

-

-

2. Public

- (a) Local
- (b) State
- (c) Federal

\$ 9,786.

-

\$ 69,934.

D. Total

\$ 215,863.

TABLE 9ff

MUNICIPAL SUMMARY

TOWN OF MANCHESTER, ESSEX COUNTY, MASSACHUSETTS

|    |                            |              |
|----|----------------------------|--------------|
| A. | Property Loss              |              |
| 1. | Private                    |              |
|    | (a) Residential            | \$1,557,000. |
|    | i. Building                | \$ 35,100.   |
|    | ii. Contents               | \$ 5,800.    |
|    | (b) Commercial/Industrial  | \$ 417,000.  |
|    | i. Building                | \$ 36,300.   |
|    | ii. Contents               | \$ 5,000.    |
|    | (c) Other                  | -            |
| 2. | Public                     |              |
|    | (a) Local                  | \$ 323,159.  |
|    | (b) State                  | -            |
|    | (c) Federal                | -            |
| B. | Natural Resource Loss      |              |
| 1. | Commercial                 |              |
|    | (a) Water-Based            | -            |
|    | (b) Land-Based             | -            |
| 2. | Public                     | \$ 12,290.   |
| C. | Indirect Expenses Incurred |              |
| 1. | Private                    |              |
|    | (a) Residential            | -            |
|    | (b) Commercial/Industrial  | -            |
|    | (c) Other                  | -            |
| 2. | Public                     |              |
|    | (a) Local                  | -            |
|    | (b) State                  | -            |
|    | (c) Federal                | \$ 2,264.    |
| D. | Total                      | \$2,311,713. |

TABLE 9gg

MUNICIPAL SUMMARY

CITY OF GLOUCESTER, ESSEX COUNTY, MASSACHUSETTS

|     |                            |               |
|-----|----------------------------|---------------|
| A.  | Property Loss              |               |
| 1.  | Private                    |               |
| (a) | Residential                | \$13,500,000. |
| i.  | Building                   | \$ 295,700.   |
| ii. | Contents                   | \$ 51,100.    |
| (b) | Commercial/Industrial      | \$ 5,807,365. |
| i.  | Building                   | \$ 56,900.    |
| ii. | Contents                   | \$ 2,200.     |
| (c) | Other                      | \$ 19,000.    |
| 2.  | Public                     |               |
| (a) | Local                      | \$ 534,256.   |
| (b) | State                      | -             |
| (c) | Federal                    | \$ 25,000.    |
| B.  | Natural Resource Loss      |               |
| 1.  | Commercial                 |               |
| (a) | Water-Based                | -             |
| (b) | Land-Based                 | -             |
| 2.  | Public                     | \$ 225,283.   |
| C.  | Indirect Expenses Incurred |               |
| 1.  | Private                    |               |
| (a) | Residential                | -             |
| (b) | Commercial/Industrial      | \$17,888,474. |
| (c) | Other                      | \$ 3,559.     |
| 2.  | Public                     |               |
| (a) | Local                      | -             |
| (b) | State                      | -             |
| (c) | Federal                    | \$ 70,121.    |
| D.  | Total                      | \$38,073,058. |

TABLE 9hh

MUNICIPAL SUMMARY

TOWN OF ROCKPORT, ESSEX COUNTY, MASSACHUSETTS

|     |                            |              |
|-----|----------------------------|--------------|
| A.  | Property Loss              |              |
| 1.  | Private                    |              |
| (a) | Residential                | \$ 311,850.  |
| i.  | Building                   | \$ 209,400.  |
| ii. | Contents                   | \$ 46,400.   |
| (b) | Commercial/Industrial      | \$ 512,000.  |
| i.  | Building                   | \$ 5,700.    |
| ii. | Contents                   | -            |
| (c) | Other                      | \$ 10,000.   |
| 2.  | Public                     |              |
| (a) | Local                      | \$ 957,507.  |
| (b) | State                      | -            |
| (c) | Federal                    | -            |
| B.  | Natural Resource Loss      |              |
| 1.  | Commercial                 |              |
| (a) | Water-Based                | -            |
| (b) | Land-Based                 | -            |
| 2.  | Public                     | -            |
| C.  | Indirect Expenses Incurred |              |
| 1.  | Private                    |              |
| (a) | Residential                | -            |
| (b) | Commercial/Industrial      | -            |
| (c) | Other                      | \$ 3,599.    |
| 2.  | Public                     |              |
| (a) | Local                      | -            |
| (b) | State                      | -            |
| (c) | Federal                    | \$ 38,556.   |
| D.  | Total                      | \$1,833,512. |

TABLE 9ii

MUNICIPAL SUMMARY

TOWN OF ESSEX, ESSEX COUNTY, MASSACHUSETTS

A. Property Loss

1. Private

|                           |             |
|---------------------------|-------------|
| (a) Residential           | \$ 236,968. |
| i. Building               | \$ 3,300.   |
| ii. Contents              | \$ 2,500.   |
| (b) Commercial/Industrial | \$ 121,468. |
| i. Building               | \$ 21,100.  |
| ii. Contents              | \$ 11,600.  |
| (c) Other                 | -           |

2. Public

|             |           |
|-------------|-----------|
| (a) Local   | \$ 2,679. |
| (b) State   | -         |
| (c) Federal | -         |

B. Natural Resource Loss

1. Commercial

|                 |   |
|-----------------|---|
| (a) Water-Based | - |
| (b) Land-Based  | - |

2. Public -

C. Indirect Expenses Incurred

1. Private

|                           |   |
|---------------------------|---|
| (a) Residential           | - |
| (b) Commercial/Industrial | - |
| (c) Other                 | - |

2. Public

|             |           |
|-------------|-----------|
| (a) Local   | \$ 156.   |
| (b) State   | \$ 2,160. |
| (c) Federal | -         |

D. Total

\$ 363,431.

TABLE 9jj

MUNICIPAL SUMMARY

TOWN OF IPSWICH, ESSEX COUNTY, MASSACHUSETTS

|    |                            |             |
|----|----------------------------|-------------|
| A. | Property Loss              |             |
| 1. | Private                    |             |
|    | (a) Residential            | \$ 179,000. |
|    | i. Building                | \$ 21,200.  |
|    | ii. Contents               | \$ 1,000.   |
|    | (b) Commercial/Industrial  | \$ 35,000.  |
|    | i. Building                | -           |
|    | ii. Contents               | -           |
|    | (c) Other                  | \$ 4,290.   |
| 2. | Public                     |             |
|    | (a) Local                  | \$ 9,644.   |
|    | (b) State                  | \$ 3,540.   |
|    | (c) Federal                | -           |
| B. | Natural Resource Loss      |             |
| 1. | Commercial                 |             |
|    | (a) Water-Based            | -           |
|    | (b) Land-Based             | -           |
| 2. | Public                     |             |
| C. | Indirect Expenses Incurred |             |
| 1. | Private                    |             |
|    | (a) Residential            | -           |
|    | (b) Commercial/Industrial  | -           |
|    | (c) Other                  | -           |
| 2. | Public                     |             |
|    | (a) Local                  | \$ 10,000.  |
|    | (b) State                  | -           |
|    | (c) Federal                | \$ 13,944.  |
| D. | Total                      | \$ 255,418. |

TABLE 9kk

MUNICIPAL SUMMARY

TOWN OF ROWLEY, ESSEX COUNTY, MASSACHUSETTS

A. Property Loss

1. Private

|                           |           |
|---------------------------|-----------|
| (a) Residential           | -         |
| i. Building               | -         |
| ii. Contents              | -         |
| (b) Commercial/Industrial | \$ 2,000. |
| i. Building               | -         |
| ii. Contents              | -         |
| (c) Other                 | -         |

2. Public

|             |         |
|-------------|---------|
| (a) Local   | \$ 583. |
| (b) State   | -       |
| (c) Federal | -       |

B. Natural Resource Loss

1. Commercial

|                 |   |
|-----------------|---|
| (a) Water-Based | - |
| (b) Land-Based  | - |

2. Public

C. Indirect Expenses Incurred

1. Private

|                           |   |
|---------------------------|---|
| (a) Residential           | - |
| (b) Commercial/Industrial | - |
| (c) Other                 | - |

2. Public

|             |   |
|-------------|---|
| (a) Local   | - |
| (b) State   | - |
| (c) Federal | - |

D. Total \$ 2,583.

TABLE 911

MUNICIPAL SUMMARY

TOWN OF NEWBURY, ESSEX COUNTY, MASSACHUSETTS

|    |                            |             |
|----|----------------------------|-------------|
| A. | Property Loss              |             |
| 1. | Private                    |             |
|    | (a) Residential            | -           |
|    | i. Building                | \$ 136,400. |
|    | ii. Contents               | \$ 50,700.  |
|    | (b) Commercial/Industrial  | \$ 10,000.  |
|    | i. Building                | \$ 13,500.  |
|    | ii. Contents               | \$ 17,200.  |
|    | (c) Other                  | -           |
| 2. | Public                     |             |
|    | (a) Local                  | \$ 81,903.  |
|    | (b) State                  | -           |
|    | (c) Federal                | -           |
| B. | Natural Resource Loss      |             |
| 1. | Commercial                 |             |
|    | (a) Water-Based            | -           |
|    | (b) Land-Based             | -           |
| 2. | Public                     | -           |
| C. | Indirect Expenses Incurred |             |
| 1. | Private                    |             |
|    | (a) Residential            | -           |
|    | (b) Commercial/Industrial  | -           |
|    | (c) Other                  | -           |
| 2. | Public                     |             |
|    | (a) Local                  | \$ 6,072.   |
|    | (b) State                  | -           |
|    | (c) Federal                | \$ 16,218.  |
| D. | Total                      | \$ 321,993. |



TABLE 9mm

MUNICIPAL SUMMARY

TOWN OF NEWBURYPORT, ESSEX COUNTY, MASSACHUSETTS

A. Property Loss

1. Private

(a) Residential

-

- i. Building
- ii. Contents

\$ 191,200.

\$ 79,200.

(b) Commercial/Industrial

\$ 35,000.

- i. Building
- ii. Contents

\$ 4,200.

\$ 11,900.

(c) Other

-

2. Public

(a) Local

\$ 89,101.

(b) State

-

(c) Federal

\$ 12,000.

B. Natural Resource Loss

1. Commercial

- (a) Water-Based
- (b) Land-Based

-

-

2. Public

-

C. Indirect Expenses Incurred

1. Private

- (a) Residential
- (b) Commercial/Industrial
- (c) Other

-

-

-

2. Public

- (a) Local
- (b) State
- (c) Federal

-

-

\$ 12,410.

D. Total

\$ 418,911.

TABLE 9nn

MUNICIPAL SUMMARY

TOWN OF SALISBURY, ESSEX COUNTY, MASSACHUSETTS

|     |                            |               |
|-----|----------------------------|---------------|
| A.  | Property Loss              |               |
| 1.  | Private                    |               |
| (a) | Residential                | \$ 280,000.   |
| i.  | Building                   | \$ 138,400.   |
| ii. | Contents                   | \$ 46,100.    |
| (b) | Commercial/Industrial      | \$ 1,570,000. |
| i.  | Building                   | \$ 203,200.   |
| ii. | Contents                   | \$ 56,500.    |
| (c) | Other                      | -             |
| 2.  | Public                     |               |
| (a) | Local                      | \$ 40,078.    |
| (b) | State                      | \$ 224,585.   |
| (c) | Federal                    | -             |
| B.  | Natural Resource Loss      |               |
| 1.  | Commercial                 |               |
| (a) | Water-Based                | -             |
| (b) | Land-Based                 | -             |
| 2.  | Public                     | \$ 1,276,100. |
| C.  | Indirect Expenses Incurred |               |
| 1.  | Private                    |               |
| (a) | Residential                | -             |
| (b) | Commercial/Industrial      | -             |
| (c) | Other                      | -             |
| 2.  | Public                     |               |
| (a) | Local                      | \$ 1,696.     |
| (b) | State                      | -             |
| (c) | Federal                    | \$ 50,555.    |
| D.  | Total                      | \$ 3,443,014. |

TABLE 900

MUNICIPAL SUMMARY

TOWN OF SEABROOK, ROCKINGHAM COUNTY, NEW HAMPSHIRE

|    |                            |          |
|----|----------------------------|----------|
| A. | Property Loss              |          |
| 1. | Private                    |          |
|    | (a) Residential            | -        |
|    | i. Building                | -        |
|    | ii. Contents               | -        |
|    | (b) Commercial/Industrial  | -        |
|    | i. Building                | -        |
|    | ii. Contents               | -        |
|    | (c) Other                  | -        |
| 2. | Public                     |          |
|    | (a) Local                  | \$5,978. |
|    | (b) State                  | -        |
|    | (c) Federal                | -        |
| B. | Natural Resource Loss      |          |
| 1. | Commercial                 |          |
|    | (a) Water-Based            | -        |
|    | (b) Land-Based             | -        |
| 2. | Public                     | -        |
| C. | Indirect Expenses Incurred |          |
| 1. | Private                    |          |
|    | (a) Residential            | -        |
|    | (b) Commercial/Industrial  | -        |
|    | (c) Other                  | -        |
| 2. | Public                     |          |
|    | (a) Local                  | -        |
|    | (b) State                  | -        |
|    | (c) Federal                | -        |
| D. | Total                      | \$5,978. |

TABLE 9pp

MUNICIPAL SUMMARY

TOWN OF HAMPTON, ROCKINGHAM COUNTY, NEW HAMPSHIRE

|     |                            |            |
|-----|----------------------------|------------|
| A.  | Property Loss              |            |
| 1.  | Private                    |            |
| (a) | Residential                | -          |
| i.  | Building                   | \$469,600. |
| ii. | Contents                   | \$ 98,700. |
| (b) | Commercial/Industrial      | -          |
| i.  | Building                   | \$118,300. |
| ii. | Contents                   | \$ 22,400. |
| (c) | Other                      | -          |
| 2.  | Public                     |            |
| (a) | Local                      | \$ 10,015. |
| (b) | State                      | \$ 3,151.  |
| (c) | Federal                    | -          |
| B.  | Natural Resource Loss      |            |
| 1.  | Commercial                 |            |
| (a) | Water-Based                | -          |
| (b) | Land-Based                 | -          |
| 2.  | Public                     | -          |
| C.  | Indirect Expenses Incurred |            |
| 1.  | Private                    |            |
| (a) | Residential                | -          |
| (b) | Commercial/Industrial      | -          |
| (c) | Other                      | \$ 4,487.  |
| 2.  | Public                     |            |
| (a) | Local                      | \$ 2,326.  |
| (b) | State                      | \$ 10,338. |
| (c) | Federal                    | \$182,401. |
| D.  | Total                      | \$921,718. |

TABLE 9qq

MUNICIPAL SUMMARY

TOWN OF NORTH HAMPTON, ROCKINGHAM COUNTY, NEW HAMPSHIRE

|    |                            |            |
|----|----------------------------|------------|
| A. | Property Loss              |            |
| 1. | Private                    |            |
|    | (a) Residential            | \$105,000. |
|    | i. Building                | \$ 21,600. |
|    | ii. Contents               | \$ 5,100.  |
|    | (b) Commercial/Industrial  | \$200,000. |
|    | i. Building                | -          |
|    | ii. Contents               | -          |
|    | (c) Other                  | -          |
| 2. | Public                     |            |
|    | (a) Local                  | \$ 5,908.  |
|    | (b) State                  | \$ 16,354. |
|    | (c) Federal                | -          |
| B. | Natural Resource Loss      |            |
| 1. | Commercial                 |            |
|    | (a) Water-Based            | -          |
|    | (b) Land-Based             | -          |
| 2. | Public                     | -          |
| C. | Indirect Expenses Incurred |            |
| 1. | Private                    |            |
|    | (a) Residential            | -          |
|    | (b) Commercial/Industrial  | -          |
|    | (c) Other                  | -          |
| 2. | Public                     |            |
|    | (a) Local                  | -          |
|    | (b) State                  | \$ 12,236. |
|    | (c) Federal                | \$ 2,033.  |
| D. | Total                      | \$341,531. |

TABLE 9rr

MUNICIPAL SUMMARY

TOWN OF RYE, ROCKINGHAM COUNTY, NEW HAMPSHIRE

|     |                            |            |
|-----|----------------------------|------------|
| A.  | Property Loss              |            |
| 1.  | Private                    |            |
| (a) | Residential                | \$ 5,350.  |
| i.  | Building                   | \$114,600. |
| ii. | Contents                   | \$ 25,700. |
| (b) | Commercial/Industrial      | \$29,770.  |
| i.  | Building                   | \$30,600.  |
| ii. | Contents                   | \$ 5,300.  |
| (c) | Other                      | -          |
| 2.  | Public                     |            |
| (a) | Local                      | \$ 9,180.  |
| (b) | State                      | -          |
| (c) | Federal                    | -          |
| B.  | Natural Resource Loss      |            |
| 1.  | Commercial                 |            |
| (a) | Water-Based                | -          |
| (b) | Land-Based                 | -          |
| 2.  | Public                     | -          |
| C.  | Indirect Expenses Incurred |            |
| 1.  | Private                    |            |
| (a) | Residential                | -          |
| (b) | Commercial/Industrial      | -          |
| (c) | Other                      | -          |
| 2.  | Public                     |            |
| (a) | Local                      | \$ 432.    |
| (b) | State                      | \$13,769.  |
| (c) | Federal                    | \$30,676.  |
| D.  | Total                      | \$230,257. |

TABLE 9ss

MUNICIPAL SUMMARY

TOWN OF PORTSMOUTH, ROCKINGHAM COUNTY, NEW HAMPSHIRE

A. Property Loss

1. Private

(a) Residential \$ 34,000.

i. Building -

ii. Contents -

(b) Commercial/Industrial -

i. Building \$ 43,400.

ii. Contents \$ 4,500.

(c) Other -

2. Public

(a) Local \$ 7,219.

(b) State -

(c) Federal \$149,500.

B. Natural Resource Loss

1. Commercial

(a) Water-Based -

(b) Land-Based -

2. Public -

C. Indirect Expenses Incurred

1. Private

(a) Residential -

(b) Commercial/Industrial -

(c) Other \$ 1,695.

2. Public

(a) Local -

(b) State -

(c) Federal -

D. Total

\$240,314.

TABLE 9tt

MUNICIPAL SUMMARY

TOWN OF NEW CASTLE, ROCKINGHAM COUNTY, NEW HAMPSHIRE

|    |                            |          |
|----|----------------------------|----------|
| A. | Property Loss              |          |
| 1. | Private                    |          |
|    | (a) Residential            | -        |
|    | i. Building                | \$ 500.  |
|    | ii. Contents               | -        |
|    | (b) Commercial/Industrial  | -        |
|    | i. Building                | -        |
|    | ii. Contents               | -        |
|    | (c) Other                  | -        |
| 2. | Public                     |          |
|    | (a) Local                  | \$ 773.  |
|    | (b) State                  | \$1,546. |
|    | (c) Federal                | -        |
| B. | Natural Resource Loss      |          |
| 1. | Commercial                 |          |
|    | (a) Water-Based            | -        |
|    | (b) Land-Based             | -        |
| 2. | Public                     | -        |
| C. | Indirect Expenses Incurred |          |
| 1. | Private                    |          |
|    | (a) Residential            | -        |
|    | (b) Commercial/Industrial  | -        |
| 2. | Public                     |          |
|    | (a) Local                  | -        |
|    | (b) State                  | -        |
|    | (c) Federal                | \$4,257. |
| D. | Total                      | \$7,076. |



TABLE 10a  
STATE SUMMARY  
COMMONWEALTH OF MASSACHUSETTS

A. Property Loss

1. Private

|                           |                |
|---------------------------|----------------|
| (a) Residential           | \$ 84,657,000. |
| i. Building               | \$ 13,088,500. |
| ii. Contents              | \$ 3,379,600.  |
| (b) Commercial/Industrial | \$ 67,716,000. |
| i. Building               | \$ 1,123,200.  |
| ii. Contents              | \$ 680,300.    |
| (c) Other                 | \$ 876,514.    |

2. Public

|             |                |
|-------------|----------------|
| (a) Local   | \$ 20,095,922. |
| (b) State   | \$ 1,302,051.  |
| (c) Federal | \$ 4,095,000.  |

B. Natural Resource Loss

1. Commercial

|                 |   |
|-----------------|---|
| (a) Water-Based | - |
| (b) Land-Based  | - |

|           |               |
|-----------|---------------|
| 2. Public | \$ 5,368,847. |
|-----------|---------------|

C. Indirect Expenses Incurred

1. Private

|                           |                |
|---------------------------|----------------|
| (a) Residential           | -              |
| (b) Commercial/Industrial | \$ 18,131,674. |
| (c) Other                 | \$ 1,772,238.  |

2. Public

|             |                |
|-------------|----------------|
| (a) Local   | \$ 5,017,635.  |
| (b) State   | \$ 10,000.     |
| (c) Federal | \$ 30,368,876. |

|          |                 |
|----------|-----------------|
| D. Total | \$ 257,683,357. |
|----------|-----------------|

TABLE 10b  
STATE SUMMARY  
STATE OF NEW HAMPSHIRE

A. Property Loss

1. Private

|                           |               |
|---------------------------|---------------|
| (a) Residential           | \$ 1,665,900. |
| i. Building               | \$ 606,300.   |
| ii. Contents              | \$ 124,400.   |
| (b) Commercial/Industrial | \$ 2,897,500. |
| i. Building               | \$ 197,400.   |
| ii. Contents              | \$ 32,200.    |
| (c) Other                 | -             |

2. Public

|             |               |
|-------------|---------------|
| (a) Local   | \$ 39,073.    |
| (b) State   | \$ 21,051.    |
| (c) Federal | \$ 2,344,500. |

B. Natural Resource Loss

1. Commercial

|                 |   |
|-----------------|---|
| (a) Water-Based | - |
| (b) Land-Based  | - |

2. Public -

C. Indirect Expenses Incurred

1. Private

|                           |           |
|---------------------------|-----------|
| (a) Residential           | -         |
| (b) Commercial/Industrial | -         |
| (c) Other                 | \$ 6,182. |

2. Public

|             |             |
|-------------|-------------|
| (a) Local   | \$ 2,758.   |
| (b) State   | \$ 36,343.  |
| (c) Federal | \$ 661,487. |

D. Total \$ 8,635,094.

TABLE 11  
CONSOLIDATED SUMMARY

|                               |                |
|-------------------------------|----------------|
| A. Property Loss              |                |
| 1. Private                    |                |
| (a) Residential               | \$ 86,322,900. |
| i. Building                   | \$ 13,694,800. |
| ii. Contents                  | \$ 3,504,000.  |
| (b) Commercial/Industrial     | \$ 70,613,500. |
| i. Building                   | \$ 1,206,000.  |
| ii. Contents                  | \$ 712,500.    |
| (c) Other                     | \$ 876,514.    |
| 2. Public                     |                |
| (a) Local                     | \$ 20,134,995. |
| (b) State                     | \$ 1,323,102.  |
| (c) Federal                   | \$ 6,439,500.  |
| B. Natural Resource Loss      |                |
| 1. Commercial                 |                |
| (a) Water-Based               | -              |
| (b) Land-Based                | -              |
| 2. Public                     | \$ 5,368,847.  |
| C. Indirect Expenses Incurred |                |
| 1. Private                    |                |
| (a) Residential               | -              |
| (b) Commercial/Industrial     | \$ 18,131,674. |
| (c) Other                     | \$ 1,778,420.  |
| 2. Public                     |                |
| (a) Local                     | \$ 5,020,393.  |
| (b) State                     | \$ 46,343.     |
| (c) Federal                   | \$ 31,030,363. |
| D. Total                      | \$266,318,451. |

TABLE 12

LEVEL OF INVOLVEMENT - FEDERAL (MASSACHUSETTS)

A. FEDERAL DISASTER ASSISTANCE ADMINISTRATION

- a. Individual and Family Grants
- b. Crisis Counseling, Intervention
- 1. HOUSING AND URBAN DEVELOPMENT
  - a. Temporary Housing - Phase I
  - b. Federal Insurance Administration
- 2. SMALL BUSINESS ADMINISTRATION
  - a. Home and Personal Loans
  - b. Business Loans
- 3. DEPARTMENT OF LABOR
  - a. Food and Nutrition Service (Food Stamps)
  - b. Farmers Home Administration
- 4. INTERNAL REVENUE SERVICE
  - a. Casualty Loss Refund
- 5. COMMUNITY SERVICES ADMINISTRATION
  - a. Grants to local Community Action Agencies for food and fuel
- 6. VETERANS ADMINISTRATION
- 7. SOCIAL SECURITY ADMINISTRATION
- 8. 20th ENGINEER BRIGADE
  - a. 17th Engineer Battalion
  - b. 27th Engineer Battalion
  - c. 39th Engineer Battalion
  - d. 368th Engineer Battalion (USAR)
  - e. 483rd Engineer Battalion (USAR)
- 9. AMERICAN RED CROSS (direct coordination)
- 10. SALVATION ARMY (direct coordination)

TABLE 12 (Continued)

B. DEPARTMENT OF HEALTH EDUCATION AND WELFARE

a. Office of Education

C. FEDERAL HIGHWAY ADMINISTRATION

a. Emergency Relief Funds

D. U.S. ARMY, CORPS OF ENGINEERS

TABLE 13

LEVEL OF INVOLVEMENT - FEDERAL (NEW HAMPSHIRE)

(Longterm Disaster Recovery)

A. FEDERAL DISASTER ASSISTANCE ADMINISTRATION

- a. Individual and Family Grants
- b. Crisis Counseling, Intervention
- 1. HOUSING AND URBAN DEVELOPMENT
  - a. Temporary Housing - Phase I
  - b. Federal Insurance Administration
- 2. SMALL BUSINESS ADMINISTRATION
  - a. Home and Personal Loans
  - b. Business Loans
- 3. DEPARTMENT OF LABOR
  - a. Food and Nutrition Service (Food Stamps)
  - b. Farmers Home Administration
- 4. INTERNAL REVENUE SERVICE
  - a. Casualty Loss Refund
- 5. COMMUNITY SERVICES ADMINISTRATION
  - a. Grants to local Community Action Agencies for food and fuel
- 6. VETERAN'S ADMINISTRATION
- 7. SOCIAL SECURITY ADMINISTRATION
- 8. AMERICAN RED CROSS (direct coordination)
- 9. SALVATION ARMY (direct coordination)

B. DEPARTMENT OF HEALTH, EDUCATION AND WELFARE

- a. Office of Education

C. FEDERAL HIGHWAY ADMINISTRATION

- a. Emergency Relief Funds

D. U.S. ARMY, CORPS OF ENGINEERS

TABLE 14

LEVEL OF INVOLVEMENT - COMMONWEALTH OF MASSACHUSETTS

A. GOVERNOR

B. LT. GOVERNOR

C. DEPARTMENT OF PUBLIC SAFETY

1. CIVIL DEFENSE AGENCY
  - a. State Police
  - b. Registry of Motor Vehicles
  - c. Other State and Local Authorities
2. MASSACHUSETTS ARMY NATIONAL GUARD

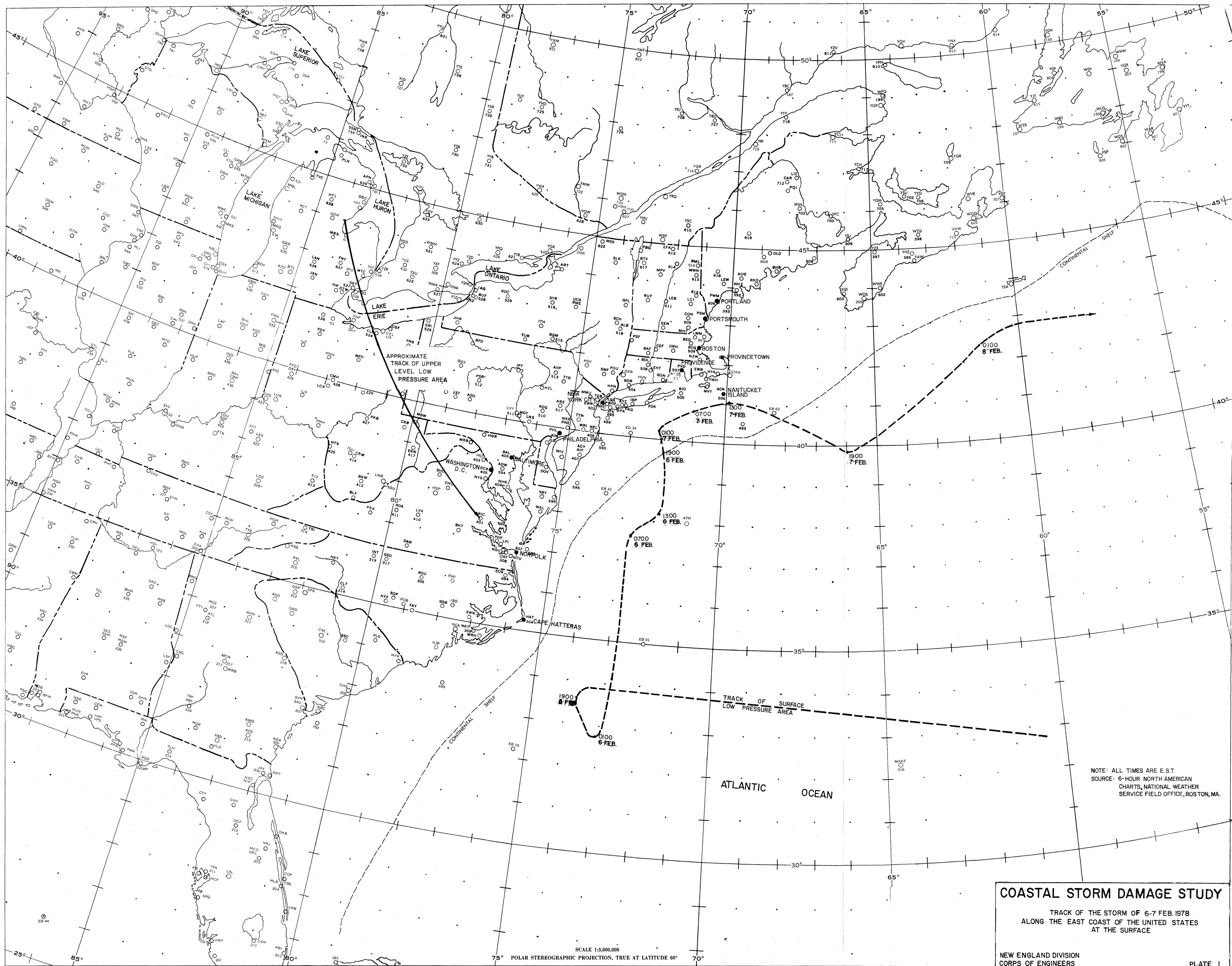
TABLE 15

LEVEL OF INVOLVEMENT - STATE OF NEW HAMPSHIRE

A. GOVERNOR

1. STATE COORDINATING OFFICER (Adj. General of Nat'l Guard)
  - a. New Hampshire National Guard
  - b. Department of Public Safety
  - c. Other State Agencies

(1) Local Municipalities



NOTE: ALL TIMES ARE E.S.T.  
SOURCE: 6-HOUR NORTH AMERICAN  
CHARTS, NATIONAL WEATHER  
SERVICE FIELD OFFICE, BOSTON, MA.

### COASTAL STORM DAMAGE STUDY

TRACK OF THE STORM OF 6-7 FEB. 1978  
ALONG THE EAST COAST OF THE UNITED STATES  
AT THE SURFACE

NEW ENGLAND DIVISION  
CORPS OF ENGINEERS



